Geography of India

PATTERSON

PART I

INDIA AS A WHOLE

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A

Geography of India

Physical, Political and Commercial

BY

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Part I. India as a Whole

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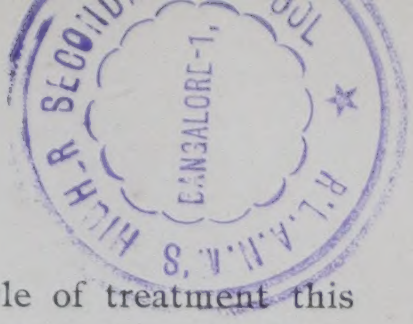

Preface

IN its main substance and style of treatment this book is an enlargement of the Chapter on India in my *Handbook of Geography for Indian Schools and Colleges*, but many subjects which it was impossible even to touch upon there are introduced here. It may be thought that I have given a somewhat wide interpretation to the term *Geography*, and perhaps that is so. I have not confined myself to mere topographical or physical details. There are many subjects briefly treated in this little book of which the youths who graduate from our Indian Universities are too often sadly ignorant, but which it greatly concerns them to know.

In the spelling of Indian proper names I have in most instances followed the revised edition of the *Imperial Gazetteer of India*. All political, commercial and statistical information is brought down to the end of the year 1907, and much of it to a still later date.

G. P.

LONDON,

30th August, 1909.

PART II of this book—INDIA IN PROVINCES AND STATES—is issued uniform with the present volume, Price 10 annas. PARTS I AND II, bound together in one volume, Price Rs. 1.

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GEOGRAPHY OF INDIA

PART I. INDIA AS A WHOLE

CHAPTER I

GENERAL VIEW

(1) Geographical Position

1. The great continent of Asia divides in the south into three vast peninsulas; **Arabia** on the west, **Indo-China** on the east, and the southern half of **India** in the centre. India proper includes the whole of the central peninsula, and stretches northwards to the mountain ranges which separate it from Central Asia. The northern half is often called **Continental India**, to distinguish it from **Peninsular India**, the southern half. The Tropic of Cancer is, speaking roughly, the dividing line between these two. From this line Peninsular India stretches southwards for more than 15°, or over 1,000 miles; while Continental India extends almost as far to the north.

2. The natural boundaries of India are exceedingly well defined. The peninsula is separated from Arabia by the **Arabian Sea**, and from Indo-China by the **Bay of Bengal.** These two arms of the Indian Ocean give the peninsula a

coast line of nearly 3,000 miles. In the north the Himālayas form an almost impassable barrier for 1,500 miles. On the north-west for 800 miles, and on the north-east for 400 miles are regions of more broken mountainous country stretching in ever diminishing altitudes from the extremities of the Himālayan wall to the sea. These give north-west and north-east frontiers, both of which are fairly well defined. As frontiers they are imperfect only in comparison with the mighty mountainous ramparts which protect the north. No other country, of equal extent, not being an island, is so completely isolated as India, or forms so true a geographical unity. This fact, more than any other single cause, has moulded its destiny and guided the development of its people.

3. In strict geographical usage the name INDIA should be applied only to this well-defined geographical whole. In common use, however, a wider sense is often given to it, making it synonymous with **The Indian Empire.** The Empire of India extends beyond the natural boundaries of India proper, both on the east and the west. On the east it takes in **Burma** and on the west **Baluchistān,** both of which are frequently spoken of as provinces of India. This is convenient when political matters are under consideration. But it should not be forgotten that it is *only* politically that either of these provinces belongs to India. In almost all the aspects with which non-political geography is concerned, both the Indo-Chinese peninsula and Baluchistān are widely different from India proper.

4. On the other hand the island of **Ceylon,** though *politically* separated from India, *geographically* belongs to it, being a part of the great land-mass which forms the Indian peninsula. Ceylon is a "continental island," standing on the "continental shelf." At one time the shallow strait which now separates Ceylon from the mainland did not exist; and a very slight elevation of the bed of the strait would make it a part of south India again. In all their physical conditions Ceylon and the southern part of the peninsula are one, though the name *India* is never used to include the Island Colony.

(2) The Indian Seas

5. The Indian peninsula is washed on the east by the **Bay of Bengal**, and on the west by the **Arabian Sea.** If the level of these seas were reduced by but a few feet, Ceylon would be united with the mainland by a narrow isthmus. If it were reduced by 600 feet (or 100 fathoms) this isthmus would be 130 miles wide. The "hundred-

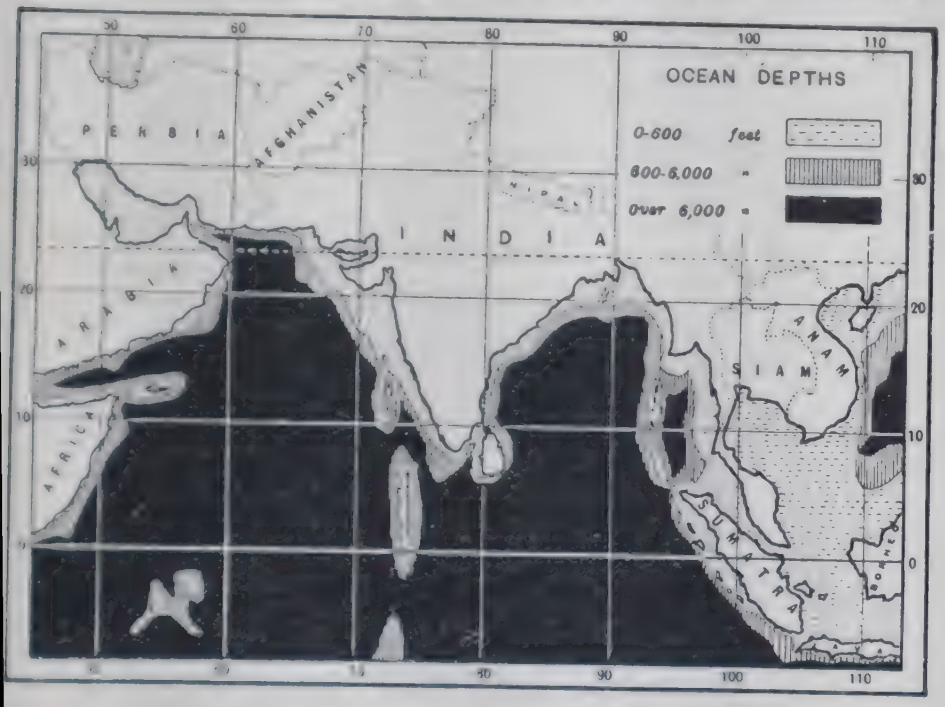


Fig. 1. Showing the Ocean Depths south of Asia.

fathom line" is commonly taken as the boundary of the "continental shelf." The depth of the water increases slowly up to this point, and then the ocean bed drops rapidly to a depth of 1,000 fathoms or more. A glance at the map (Fig. 1) will show this. Around the peninsula of India the hundred-fathom line varies in distance from the coast from about 30 miles off Madras to 300 miles off the Gulf of Cambay. Where the coast is rocky the ocean bed often drops to a great depth with exceeding rapidity. This is the case to the east of Ceylon, where a depth of over 1,000 fathoms is reached within 25 miles of the shore.

6. If the level of the surrounding seas were reduced by about 100 fathoms the *general contour* of India would not be greatly changed. Ceylon would, as we have seen, be united with the mainland, and the whole of the peninsula would be considerably increased in width, particularly in the north. The Gulfs of Cambay and Cutch would disappear. Bombay would be 250 miles from the sea, and Karāchi 80 miles; while Orissa and Chittagong would be united by land, except for one curious arm of greater depth, stretching in a north-easterly direction towards the mouth of the Ganges, which would still be claimed by the sea. But on the whole the general shape of peninsular India would be but little changed.

7. Far greater would be the changes wrought in the eastern and western peninsulas of southern Asia. In the west, the shallow Persian Gulf would be drained, and Arabia would no longer be a peninsula. In the east, Indo-China would stretch 1,000 miles south of Annam, and would take in the great islands of *Sumatra*, *Java*, *Borneo*, and the *Celebes*, which are all continental islands. The Andaman and Nicobar groups of islands would then each form one long and narrow island, and the two together would enclose between themselves and the mainland a deep and almost land-locked sea.

8. If the level of the sea were reduced by 1,000 instead of 100 fathoms, the further changes in the contour of the land would be trifling, for from 100 to 1,000 fathoms the depth increases everywhere with great rapidity. The hundred-fathom line, or the edge of the continental shelf, is thus the true continental boundary. It indicates, far more accurately than the coast line, the actual contour of the great land-mass that forms the continent.

(3) The Natural Divisions of India

9. Sir William Hunter remarks that if we could view the whole of India from a balloon, we should see that it is divided into "three separate and well-defined tracts." In the north and north-west is the **region of mountains,** the

vast Himālayan range with their allied systems. Immediately to the south is the almost equally vast **region of plains**, the soil of which has been deposited by the great rivers that drain the mountains. To the south again is the **region of plateaux**, which includes almost the whole of peninsular India. The plateaux are bounded by ranges of hills, broken along the north and east but more continuous on the west; and between the hills and the sea there is everywhere a narrow strip of alluvial land formed, like the great plains of the north, by the rivers that drain the higher land. To these three well-defined regions of India proper, we must now, if we speak of the *Empire of India*, add a fourth, viz., **Burma**—a region of alternate mountain ranges and valleys, with the great delta of the *Irrawaddy* towards the south.

(4) The Himālayan Region

10. India, we are often told, is "bounded on the north by the Himālayas." But this great mountain chain is much more than a mere boundary. The vast system of highlands of which the Himālayas form the southern wall, is of such immense importance to India that it claims the most careful attention, and forms the natural starting point for any study of Indian Geography.

11. From the **Pamīr Plateau** which lies to the north-west of Kashmīr, and from its great height is appropriately called in the native language, "the roof of the world," the **Hindu Kush** range runs in a south-westerly direction into Afghānistān. From the same centre, but running in an east-south-easterly direction, are the **Muztāgh** or **Kārākorum Mountains**, a range of great and sustained height. To the south of this range, and running at first almost parallel with it, is the western portion of the **Himālayas** proper. The river *Indus*, rising in Tibet, flows in a north-westerly direction between the Kārākorum and Himālaya ranges, breaking through the **Ladākh Range** on its course, and then, bending sharply to the south-west, divides the western extremity of the Himālayas from the spurs of the Hindu Kush. From this point the Himālayas, there called the

Zāskār range, run first in a south-easterly direction, and then gradually bend round to the east. The *Brahmaputra* (in the upper part of its course called the *Tsan-pu*) rises

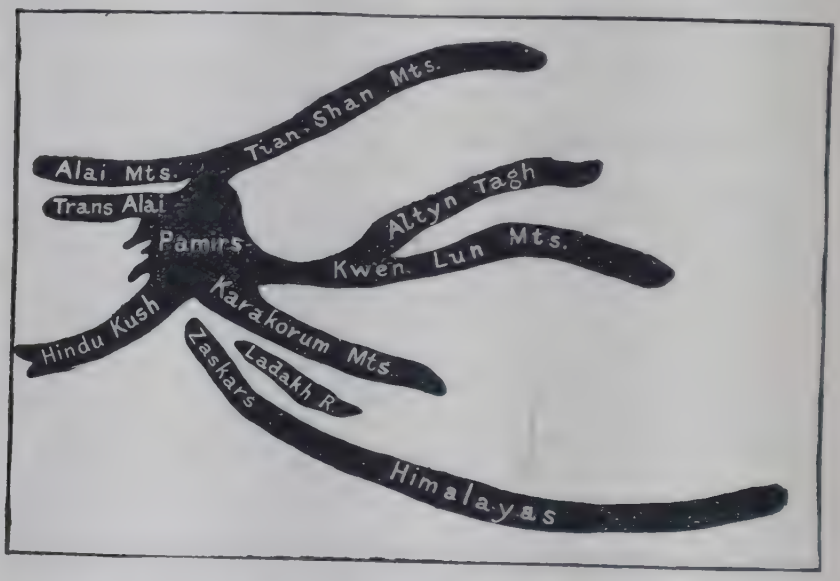


Fig. 2. Showing the mountain-chains of high elevation branching from the Pamīr Plateau.

near the Indus, north of the main range, and after flowing in an easterly direction for over 800 miles, rounds the eastern extremity of the Himālayas just as the Indus rounds the western. The entire range is thus held "within the gigantic arms" of these two mighty rivers. The length of the range is about 1,500 miles, and its width from 150 to 200 miles. In parts it is flanked on its southern side by low and detached parallel ranges of hills, wholly different in geological structure and history. But in most places the main range rises from the plains with considerable abruptness. Throughout its entire length one continuous range can be traced which contains most of the loftiest peaks, more than twenty of which exceed 24,000 feet in height.

12. The most westerly peak in the Himālayas proper is **Nanga Parbat**, which lies just within the angle of the Indus and rises to a height of 26,620 feet. About 150

miles to the north-east, and at the other side of the river, **Mount Godwin-Austen** (28,258) second only to Mt. Everest, dominates a magnificent group of peaks in the Kārākorum Range. **Nandā Devī** (25,661) is in Kumaon, south of the watershed that separates the Indus and the Tsan-pu. To the west are **Dhaulāgiri** (26,826), **Gosai Than** (26,300), **Everest,** or **Gaurisankar**, the highest mountain in the world (29,140), **Kinchinjunga** (28,176), and **Chamalhari** (23,929). In many respects Kinchinjunga is the most notable of these great mountains. It has no rival near it, so that its mighty proportions are well seen. From Darjeeling the view is particularly fine, and is admitted by most travellers to surpass in sublimity and grandeur anything to be seen elsewhere.

13. The **passes** across the Himālayas are numerous, but of comparatively little account. Some are over 18,000

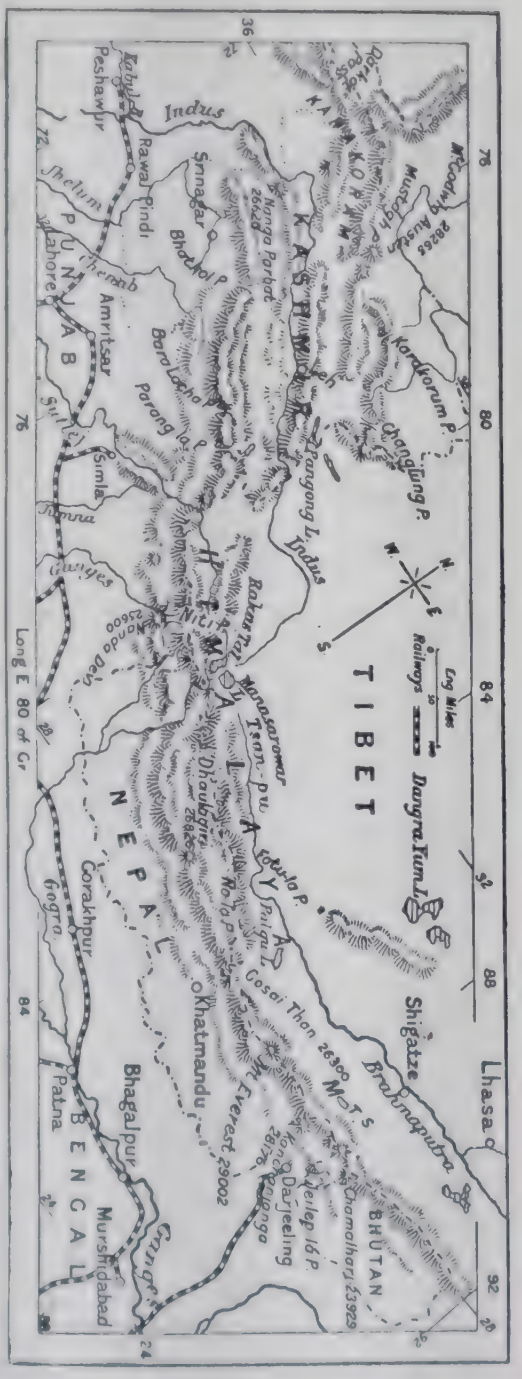


Fig. 3. The Himālayas, showing the chief peaks and passes.

feet in height. The **Bāra Lacha** and **Parang-la** passes cross into Kashmīr from the north-west corner of the Punjab. From Kashmīr one of the best roads to Lhāsa is *via* the **Pangong Lake.** Most of the trade between Northern India and Tibet has for centuries been by these routes. In the north of Kashmīr the **Kārākorum** and **Muztāgh** passes, which cross the Kārākorums respectively east and west of Mount Godwin-Austen, have been the chief routes of the trade with Central Asia. The **Niti** pass is north of Nanda Devi, near the source of the Ganges, and leads from Garhwāl into Tibet. The **No-la** pass crosses the mountains in the north of Nepāl, and the **Jailep-la** pass is south of Chamalhari, and east of Sikkim.

14. The Himālayas are, however, only the southern wall of a great mountain system which should be studied as a whole. Branching from the northern side of the **Kārākorum Range** are the **Kwen Lun Mountains** which run at first due east, then bend slightly to the north, and further east to the south again. These form the northern boundary of the **Plateau of Tibet.** Between them and the Himālayas the elevation nowhere falls below 12,000 feet, and the average is probably over 15,000. The length of the Plateau from east to west is 1,600 miles, and its width from north to south varies from 200 to 600 miles. Its area is nearly half a million square miles. There is no other mountain-mass in the whole world at all to compare with it. It is difficult to give any adequate idea of its size. The Alps of Central Europe do not cover one-thirtieth of its area,* and are greatly inferior in average height. Its importance to India can hardly be over-estimated. It forms a northern rampart which no enemy has ever scaled, and with its great southern buttress, the Himālayas, exerts an influence upon the climate and rainfall of India which has done much to determine the character of the country and the development of its people.

15. The main chain of the Himālayas, though of much greater average height than any other continuous chain traversing the plateau, does not constitute the **water-**

* See a striking map on page 123 of Holdich's "India."

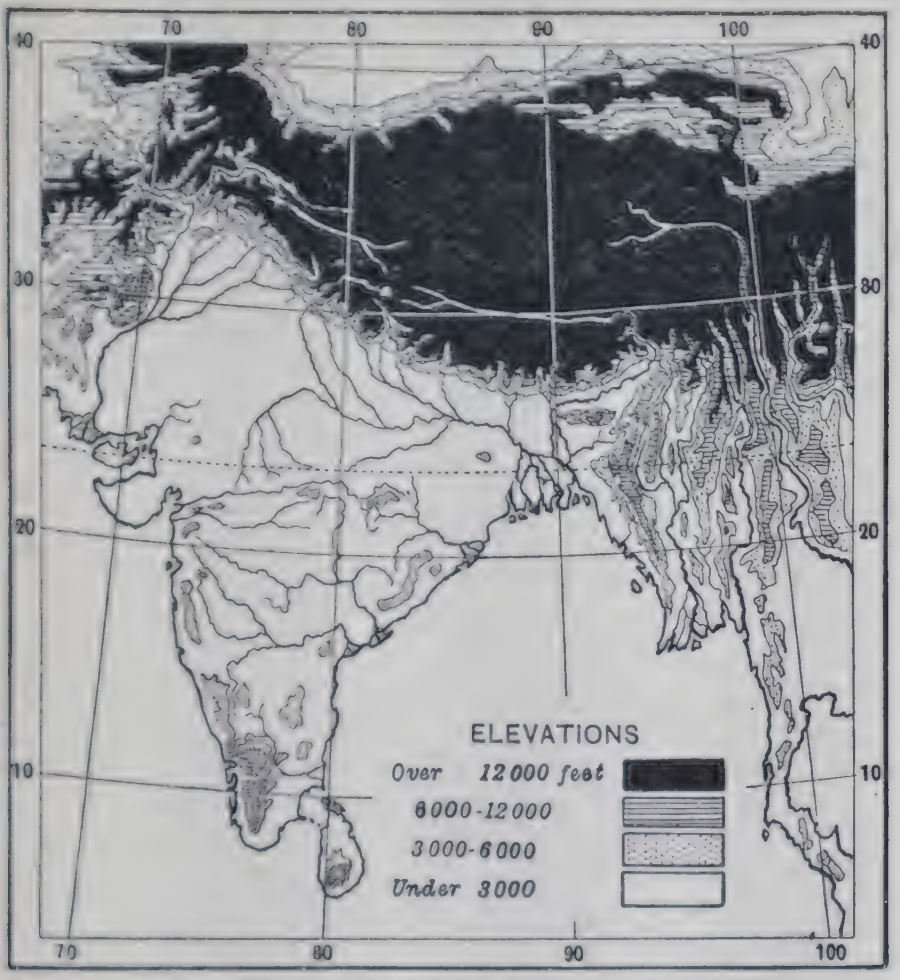


Fig. 4. Showing the extent of the Tibetan Plateau.

parting between India and Tibet, which is from 100 to 200 miles to the north of it. A second wall of the Himālayas has often therefore been assumed to run north of the trough of the Indus and Tsan-pu. Dr. Sven Hedin, the Swedish traveller, claims to have traced, during his travels in Tibet in 1907-8, a continuous chain running east and west at a distance varying from 130 to 300 miles north of the Himālayas and forming the true watershed. This range he names the **Trans Himālaya**. It is not, however, a part of the Himālayan system, but a more ancient range, and though it forms the watershed it does not rival the Himā-

layas in height. Geological evidence shows that the general lines of drainage as they exist to-day were established long before the upheaval of the main Himālayan range, and that the process of upheaval was slow enough for the rivers to maintain their ancient channels by their own erosive power. This is seen most clearly in Nepāl, where the drainage is not to the Tsan-pu in the north, but southward through deep gorges in the vast Himālayan chain, gorges which the streams themselves have cut.

16. Geological evidence also shows that the eastern Himālayas are far more ancient than the western, but the entire range is *young* in comparison with the Arāvallis or the Eastern Ghāts, both of which are of great geological antiquity. There was, doubtless, a time in very remote geological ages when what now forms the Indian peninsula was joined to South Africa by a broad stretch of land, of which we still have remnants in the Maldives, the Laccadives, the Seychelles, and Madagascar. In those early days the Eastern Ghāts constituted the eastern boundary of the land, while the Arāvallis bounded it on the west. Long ages of erosion have worn these two ranges down till they are now, probably, but a shadow of what they once were. At that time the Arāvalli peaks looked out over a vast north-western sea, which appears to have been entirely cut off from the southern ocean. The rocks which now compose the mountain systems west and north of the Indus, as well as most of the great Tibetan Plateau, were then being slowly formed at the bed of the sea. There is also abundant evidence that in subsequent ages they were repeatedly thrust upwards and again submerged, existing alternately as dry land and sea bed, until the final upheaval began which slowly raised them to their present altitudes.

17. The Eastern Ghāts were apparently also at one period connected by an unbroken chain of hills with the eastern Himālayas, a connection which continued till a comparatively recent geological age. The whole southern drainage of the Himālayas consequently, being cut off from the eastern seas, found its way across the continent

and reached the sea by the Indus valley. The gradual subsidence of a vast tract, including probably the whole of Bengal as well as a long stretch to the west, established an easterly drainage and diverted the Himālayan rivers to the Bay of Bengal. But that the main drainage of the Himālayas has from the very earliest ages been towards the south is clearly shown by the character of the beds that form the Siwāliks and other parts of the sub-Himālayan range of hills. These are all composed of fresh water deposits, which were laid down by the age-long action of rivers that drained the adjacent mountains, and then thrust upwards by much later earth-movements.

(5) Mountains of the North-West

18. Just as on the north the Himālayas separate India from the Plateau of Tibet, so on the north-west lower and more irregular ranges separate it from the great **Plateau of Iran,** which includes almost the whole of Afghānistān, Baluchistān, and Persia. The Iranian Plateau is of much inferior altitude to the Tibetan, varying from 3,000 to 5,000 feet above sea level. It is also more broken by mountains, and in the centre contains a large oval depression, the inland basin of the **Helmand,** a desert tract with an average elevation of about 1,500 feet. The ranges that divide the plateau from India run almost parallel to the river Indus, and from 50 to 150 miles west of it. They are broken and irregular, fairly high in the north, but decreasing in altitude as they approach the sea.

19. From the **Pamīr Plateau** the **Hindu Kush,** a flat-backed ridge of great elevation runs in a south-westerly direction, forming the watershed between the systems of the *Indus* and the *Oxus*. Branching from the Hindu Kush the short but lofty **Safed Koh** range runs in an easterly direction south of the *Kabul* river. From this range rugged and broken extensions stretch south as far as the river *Gomal*. South of the *Gomal* are the **Sulaimān Mountains** running north and south, of lower elevation, but culminating in the north in the lofty peak of **Takht-i-Sulaimān,** over 11,000 feet high. Towards the south the

folds of the Sulaimāns open out, and, in steadily decreasing altitudes, bend round to the west. Further to the south again, and further west, are a number of still lower ranges, running in almost parallel ridges at first in a southerly direction, and then, like the Sulaimāns, bending gradually round to the west. The most easterly of these, the **Khīrthar** range, maintains its southern direction almost to the sea.

20. These various mountain ranges form the natural **north-west frontier** of India proper. The frontier line, as in the old Sikh days, is the extreme limit of cultivation on the eastern slopes. Theoretically this is still the boundary of British India. But partly for the sake of frontier defence, and partly to bring under effective control the turbulent mountain tribes that were a constant menace to the frontier provinces and trans-frontier trade, British influence has been steadily pushed beyond the frontier. The *North Western Frontier Province* lies chiefly, and *Baluchistān* wholly beyond it. But even the latter is now practically within the boundaries of the Empire.

21. Across this frontier, which extends for nearly 850 miles, numerous **passes** over the mountains provide gateways between India on the east and Afghānistān and Baluchistān on the west. The passes across the Himālayas into Tibet are of comparatively little moment, being only the laborious routes of a small and uncertain trade. Very different is it with the passes across the North West Frontier. Every invading host that has ever penetrated into India by land has forced its way through one or other of these north-western passes. Through one or other of them also each of the successive swarms of immigrants who have helped to people India have found their way into the northern plains. As trade routes the north-western passes are greatly more valuable than those of the Himālayas; but their chief importance lies in the fact that most of them are possible military roads (or might easily be made such) through which an invading foe might again force his way. The safety of India on the north-west is only secured by the strength with which the passes are held.

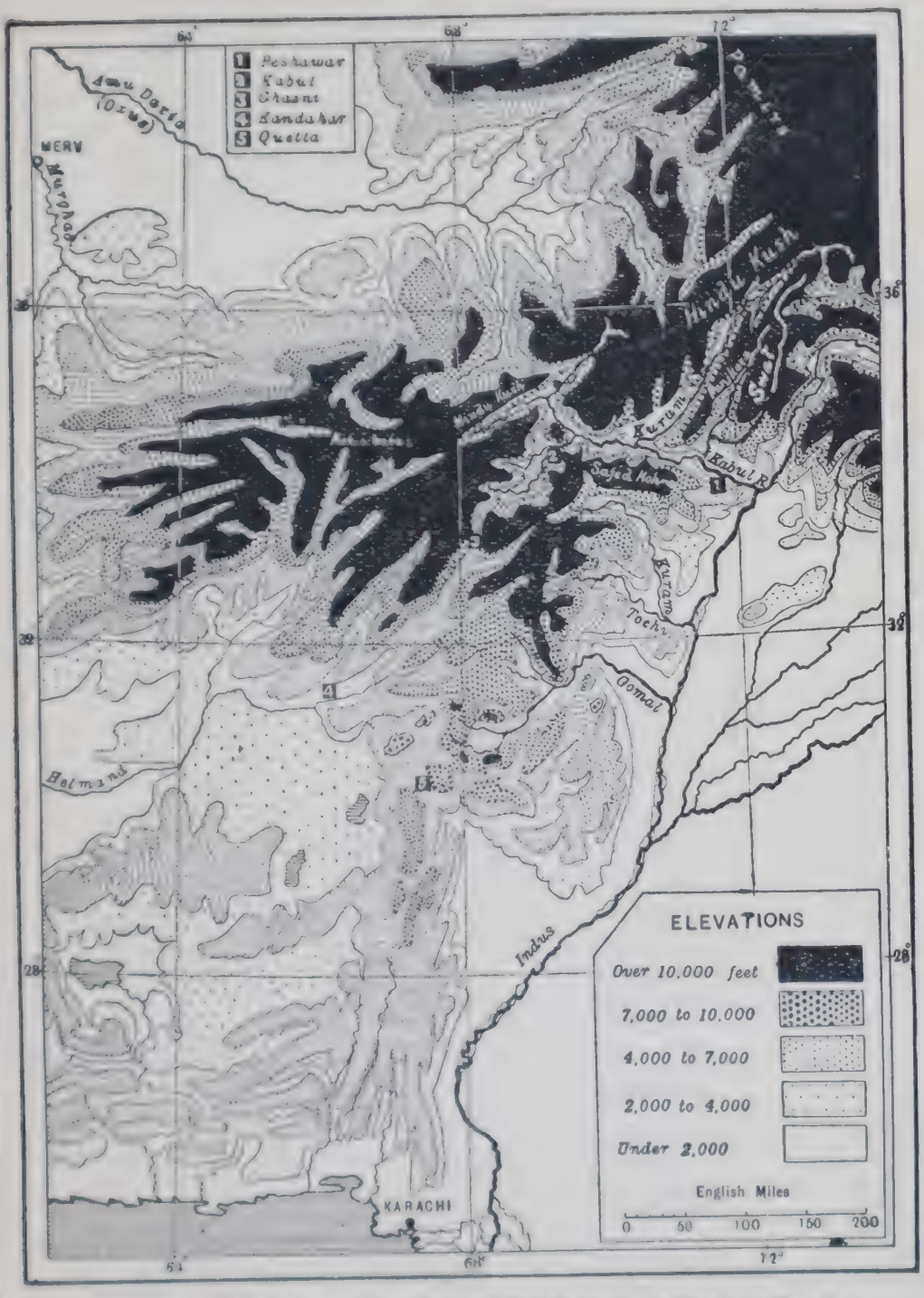


Fig. 5. The North Western Frontier Mountains from the sea to the Pamirs.

22. Until comparatively recent years almost all the passes that were regarded as of primary importance were situated to the south of the Kābul river. But now those which give communication between India and Central Asia *via* **Chitrāl** are receiving almost greater attention than any others. These are the **Malakand Pass** in the east of Chitrāl, and the **Barogil** and **Dorah** passes over the Hindu Kush. The present importance of these passes is due to the fact that they are within 100 miles of the nearest Russian outpost. To the south of the Kābul River the most important of the passes are the **Khaibar**, the **Kuram**, the **Tochi**, the **Gomal**, and the **Bolān.**

23. The **Khaibar Pass** is over the eastern spurs of the *Safed Koh*, twenty-five miles west of Peshāwar, on the road which leads from Peshāwar to Kābul. This is by far the most important line of communication between India and Afghānistān. It is an important trade route and a still more important military highway. A portion of the Khaibar route west of the pass is along the valley of the Kābul, but the pass itself is considerably south of the river, as in the eastern part of its course the Kābul river flows through impassable gorges. The **Kuram Pass** is on another route to Kābul by the valley of the Kuram river. The pass itself crosses the western spurs of the *Safed Koh* at a height of nearly 12,000 feet. The **Tochi Pass** is on the road from Bannu to Ghaznī, once the capital of Afghānistān. The road follows the valley of the Tochi, a tributary of the Kuram, and then crosses the mountains south-east of Ghaznī at a height of 11,500 feet. The **Gomal Pass** is 30 miles north of *Takht-i-Sulaimān* on the road passing up the valley of the Gomal to the plateau of Afghānistān. The Gomal marks the boundary between Afghānistān and Baluchistān. The Gomal Pass is the oldest of all the passes, and has for many centuries been the route by which the caravan trade from Persia through the valley of the Helmand has reached India. The **Bolān Pass,** which lies to the west of the southern Sulaimāns, is now traversed by a railway which connects Quetta with India, and runs beyond Quetta to the frontier of Afghānistān.

(6) The North-Eastern Frontier and the Mountains of Burma

24. The eastern extremity of the great Himālayan wall is, like the western, flanked by a series of lower chains running for the most part in a southerly or south-westerly direction. To the north-east of the bend of the Brahmaputra these ridges are arranged in almost concentric arcs curving round to the south, and the inner one to the south-west. Geologically they are of much later formation than the Himālayas, and their upheaval diverted the Brahmaputra from its original course to the east and turned its enriching flood into Assam and Bengal. These ranges form an effective boundary to Eastern Bengal and Assam, and constitute the natural north-eastern frontier of India proper. This frontier is, however, of little importance compared to the north-western. In the past there has been considerable Mongolian immigration into India across the mountain barriers, but India has been peopled almost exclusively from the west. And though the Burmese have occasionally raided parts of Assam, no great conquering host has ever penetrated into India on this side. Now that Burma is a Province of the Empire, the geographical frontier is no longer of imperial, but only of provincial, moment. But it nevertheless separates two parts of the Empire that are widely and essentially different.

25. Three main chains can be traced, which start from the bend of the Brahmaputra and continue their course far to the south. The chain nearest to the river bends sharply to the south-west and under the name **Pātkai Hills** shuts in the Brahmaputra valley on the south. The **Nāgā** and **Lushai Hills** continue the chain, bending gradually to the south again. From the Nāgās, but separated from them by a narrow valley, the **Khāsi Hills** stretch in a westerly direction into Bengal. South of the Lushais the main range takes a south-south-easterly course, and is then known as the **Arakan Yoma.** It becomes narrower and lower as it passes south and bends slightly to the west again. At Cape Negrais it dips into the sea, and continues

as a well-defined submerged range for over 500 miles, cropping up at the Coco, Andaman, and Nicobar Islands, and finally emerging as the island of Sumatra. The second main chain runs south from the northern highlands, marking the watershed between the *Irrawaddy* and the *Salwīn*. East of Bhamo it spreads out into a broad belt of highlands, known as the **Kachin Hills** in the north and the **Karenni Hills** in the south. Further south it narrows into the **Poung-loung range** which divides the *Sittang* basin from that of the *Salwīn*. Between these two main ranges in the south is a short and low range, known as the **Pegu Yoma.** It divides the basins of the *Irrawaddy* and the *Sittang*, but is nowhere over 2,000 feet in height. The third main range, the **Tanen-Taung - Gyi Mountains,** bounds the *Salwīn* basin on the east. It maintains a lofty elevation further south than either of the other ranges, and, as the **Tenasserim Yoma,** runs down the narrow arm of the peninsula, as far as *Cape Victoria*. These three *Yomas*, or ridges, give a configuration to Lower Burma totally different from anything to be found in India. They are all fairly regular and continuous, decreasing in elevation towards the south. They divide the country into narrow valleys along which the rivers take almost parallel courses to the sea.

Fig. 6. The Mountains of the N.E. Frontier and Burma. Showing the main lines of elevation irrespective of height.

(7) The Indo-Gangetic Plain

26. Immediately south of the great mountain wall, the general curves of which it closely follows, lies the **great plain of the Indus and the Ganges.** The drop from the high ranges to the plain is made with comparative abruptness, and then the plain extends southwards, with a width varying from 100 to 300 miles, till it meets the broken highlands that form the northern boundary of the Deccan. The plain is entirely alluvial, being formed of the silt brought down by the great rivers which traverse it. The thickness of the alluvial deposit does not appear to be anywhere less than 600 feet, and in the delta of the Ganges there is reason to believe that it is three times this thickness. Geologically the plain is older than the Himālayas. There are also many indications that the plain has been subjected to steady depression, acting slowly through long ages. Geologists believe that the great forces that upheaved the Himālayas also reduced the level of the plain, and that the two processes went on together, both being parts of the same great earth-movement. The eastern part of the plain was in later ages subjected to a further depression. Originally the entire plain sloped towards the west, and the whole drainage was, as we have seen, into the Arabian Sea. The later subsidence of the eastern part of the plain changed the course of the rivers, and for ages the entire drainage from the Jumna eastwards has been to the Bay of Bengal.

27. The area of the plain is about 300,000 square miles. It includes almost the whole of the basins of the Indus and Ganges, and thus stretches without a break from the Arabian Sea to the Bay of Bengal. The watershed between these two basins is slightly to the west of the city of Delhi, where the plain reaches its greatest height, 924 feet above sea-level. From that point to the mouth of the Indus is 850 miles, and to the mouth of the Ganges 1,050 miles. The slope towards the sea is thus extremely gentle on both sides, and the rivers consequently flow slowly, depositing their silt as they go. The northern and eastern portion

of this great plain is the most fertile and populous part of India. The rainfall, especially towards the east, is ample, and the river deposits greatly enrich the soil. In the east of the plain the Brahmaputra mingles its waters with those

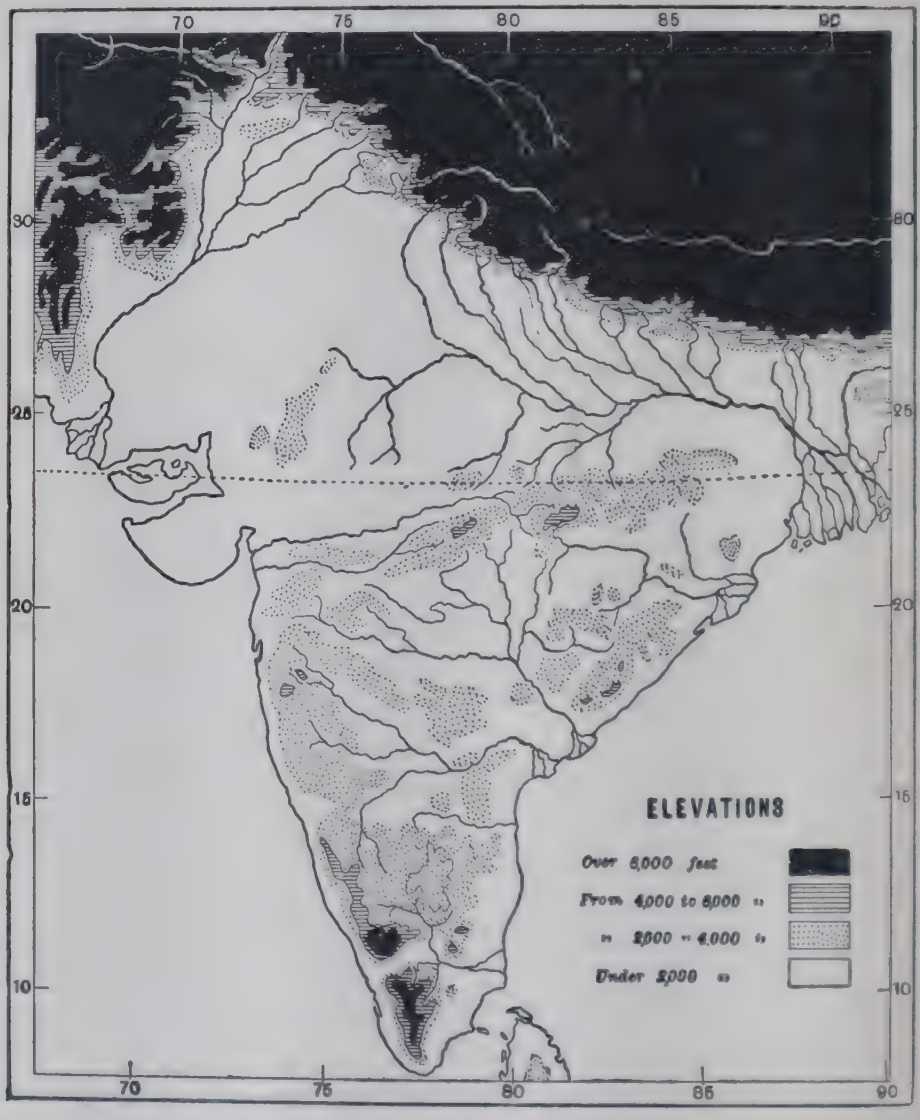


Fig. 7. The Great Plain and Peninsular India.

of the Ganges, and it has been estimated that the two rivers bring down annually more than 40,000 million cubic feet of solid matter to enlarge and enrich their common

delta. In the west a large part of the plain—that lying south-east of the Indus and at a little distance from the river—is comparatively barren. The soil is sandy and the rainfall scanty. From 50 to 80 miles east of the Indus the waters of the river are made available, either by irrigation works or by the annual overflow, but beyond that the land is desert.

(8) Peninsular India

28. South of the Indo-Gangetic Plain a belt of highlands, fairly well defined in the west, but broken and irregular in the east, runs right across India, separating the northern plains from the plateaux of the **Deccan.** This belt of hills runs, roughly speaking, along the Tropic of Cancer, so that the whole of central and southern India lies within the Tropics.

29. Starting from the west we have first of all the **Vindhya Range** running almost due east from the Gulf of Cambay. The Vindhyas are the lowest of the ranges that form this belt of highlands, and exceed 2,000 feet in height only in one or two places. They are separated from the **Sātpura Range** to the south by the narrow and beautiful valley of the Narbadā. North of the western extremity of the Vindhyas, but separated from them by the valley of the Mahī, are the southern spurs of the **Arāvallis,** a low and broken range, which stretch in a north-easterly direction into the northern plain. The highest point in the Arāvallis is **Mount Abu** in the south-west, which attains a height of 3,900 feet. The Arāvallis are, as we have seen, by far the most ancient of all the mountains in the west of India. What we see now is but the remnant of a mighty range that has survived the ravages of countless ages. The **Sātpuras** are a shorter range than the Vindhyas, but of considerably greater height. They form the north-eastern boundary of the Deccan proper. East of the Sātpuras and Vindhyas, the **Mahādeo Hills,** the **Maikal Range,** and the hills of Chotā Nāgpur, continue the belt of highlands right across the peninsula to the plains of Bengal.

30. South of this belt lies the great **Plateau of the Deccan,** which constitutes the central core of the peninsula. Except where broken in the east by the great rivers which flow into the Bay of Bengal, this plateau maintains an elevation of from 1,500 to over 3,000 feet. It is highest in the south and west, and slopes very gradually to the north and east.

31. The Plateau is bounded on the west by the **Western Ghāts,** or **Sahyādri Mountains.** The northern extremity of this range is separated from the Sātpuras by the valley of the Tāptī. From this point the Western Ghāts run southwards nearly parallel to the coast, and at no great distance from it, almost to the southern point of the peninsula. The range is fairly continuous, but there are four important breaks. Two of these are near Bombay, another near Goa, and the fourth is the **Pālghāt Gap,** 200 miles further south, where the elevation drops swiftly from over 6,000 ft. to little more than 1,000 ft. Through all these openings in the hills railways now pass, connecting the west coast with other parts of India.

32. In the south the Western Ghāts attain to much greater altitudes than in the north. Indeed, the highest peaks to be found south of the Himālayas lie immediately north and south of the Pālghāt Gap, where, in sharp contrast to the Gap itself, elevations of over 8,000 ft. are reached. The **Nīlgiri Hills** lie to the north of the Gap, the **Anamalais** to the south. Eastward of the Anamalais are the **Palnis,** and to the south stretch the **Cardomom Hills,** maintaining an altitude of over 4,000 ft. to within 25 miles of Cape Comorin. On their western side, throughout their entire length, the slope of the Western Ghāts is fairly steep, and between the foot of the hills and the sea is a well-watered and fertile strip of alluvial plain varying in width from three or four miles in its narrowest part to thirty miles in the south, where the mountains recede somewhat from the sea. On their eastern side the slope is less rapid, and the elevation drops gradually to that of the plateau.

33. The eastern boundary of the plateau is a broken range of highlands stretching southwards from the hills of

Orissa till their southernmost spurs, the **Shevaroy Hills,** almost meet the eastern spurs of the Nīlgiris. The eastern highlands, though commonly called the **Eastern Ghāts,** have little in common with their western namesakes. They are comparatively low, seldom exceeding 3,000 ft., as well as irregular and broken, and are separated from the sea by a much broader alluvial plain. Like the Arāvallis, the Eastern Ghāts are the remnants of a very ancient range, worn down by long ages of "weathering." The Western Ghāts, on the other hand, are of comparatively recent elevation. This, together with the fact that almost the whole drainage of the plateau is to the east, accounts for the greater breadth of the alluvial plain, which varies from 50 to 150 miles in width, and stretches far inland where the great rivers force their way to the sea.

34. The plateau itself is highest in the southern angle formed by the converging eastern and western ranges. In that angle lies the State of **Mysore,** a large part of which maintains an altitude of over 3,000 ft. In the west the plateau is almost everywhere well over 2,000 ft. From these higher levels it slopes gradually, and almost imperceptibly, in an easterly and northerly direction till it meets the Western Ghāts, the low crests of which seldom rise to more than 1,000 ft. above it.

(8) The Great Rivers and their Basins.

35. Most rivers begin their course as mountain torrents, and this is particularly the case in north India, where almost all the chief rivers rise at exceptionally high altitudes, and before they emerge from their mountain bed have become streams of considerable volume. Most of the Himālayan rivers take their rise at elevations varying from 10,000 to 17,000 ft., and fall swiftly almost to the level of the plains through rocky channels which they have cut out for themselves. Their fall being rapid their flow is swift, and their erosive power proportionately great. Many of them flow at the bottom of steep ravines of their own making many thousands of feet deep. Mountain

torrents cannot, therefore, change their course, but retain it from age to age, confined by the rocks through which they have cut their way. Such mountain torrents bring down a vast amount of solid matter to the level of the plains. The steep sides of their ravines are continually crumbling, and the disintegrated matter is washed into the bed of the torrent by which it is continually being carried down to lower and lower levels. If the rapidity of flow is checked at any point in the descent, so that a lake is formed, this solid matter is deposited, and in course of time a fertile valley is the result, through which the stream flows placidly to recommence its swifter descent further on. Many such valleys have thus been formed in the Himālayas, the beautiful Vale of Kashmīr being one.

36. When such a river reaches the plains, it enters upon what we may call the second stage of its life. Its flow becomes slower in proportion to the flatness of the plain, and the silt which it has brought down is rapidly deposited on its banks and bed. In seasons of flood these deposits are again disturbed and carried further down. Sometimes such a river will build up its bed to a level above that of the surrounding plain. Or sometimes, having half filled up its channel, it will, in a season of great flood, overflow its banks ; and as these banks are soft and easily destroyed, they are soon washed away, and the river cuts out a new, or auxiliary, channel for itself. As it approaches its mouth the flow becomes still slower, till in its estuaries it meets and mingles with the tidal waters of the sea. Here the final deposit of its solid matter takes place, and the land steadily encroaches on the sea. The old channels, or distributaries, of the river are continually being partially blocked up with silt, and in periods of flood its waters overflow and cut out new channels for themselves by means of which they reach the sea. Much of the silt brought down by such a river when in flood is washed out to sea. There it gradually settles, and the bed of the sea is raised around the river's mouth, or the numerous mouths of its distributaries. Mud islands presently appear, which in course of time are joined to the mainland, and others further out

are formed. So the "delta" is always being slowly enlarged, and the land pushed further and further out.

37. Such is the character of almost all the rivers of India. In one point, however, the rivers of the north contrast sharply with those of the peninsula. The former are *snow-fed*, the latter are not. The great mountains of the north are a vast storehouse of water in the form of snow. The line of perpetual snow is at a height of about 16,000 ft. on the south side of the Himālayas, and at about 18,000 to 19,000 ft. on the north side and on the mountains of the north-west. In the winter the snow does not melt, and the northern rivers are, therefore, lowest in the early months of the year, when the effect of the monsoon rains is past, and the melting of the snow has not yet begun. But as soon as the warmer weather sets in the snows begin to melt, and then for several months there is a steady supply of water to all the rivers of the north. This is greatly increased when the rains set in, and in July the Himālayan rivers are in full flood. But the flow from the snows continues long after the monsoon rains have ceased. The rivers of the peninsula have no such supply, for there are no mountains south of latitude 27° N. high enough to reach the snow line. The southern rivers, therefore, being dependent upon the rains alone, are subject to much greater variation in volume than those which come down from the north and water the great plain.

38. The great rivers of the north, the **Indus,** the **Brahmaputra,** and the **Ganges,** drain the main slopes of the Himālayas both north and south; and the Indus and Brahmaputra bring the drainage of the north round the western and eastern extremities of the mountain chain. Some of the greater tributaries of these rivers rise north of the main chain, and make their way across the chain through deep gorges between the mountains. The **Indus,** its main tributary, the **Sutlej,** the **Brahmaputra,** and the **Gogra,** one of the chief tributaries of the Ganges, take their rise within 100 miles of each other, near **Lake Mānasarowar** in Tibet, at an elevation of over 16,000 ft. The **Ganges** and another of its tributaries, the **Jumna,** rise in the

mountains to the west of this lake. Mānasarowar is thus the great hydrographic centre of North India.

39. The Indus. Rising in Tibet, the Indus flows first in a north-westerly direction for 800 miles, passing through Kashmīr between the Himālayas and the Kārākorums, and receiving the drainage of both these chains. Rounding

Fig. 8. The Basin of the Indus.

the great peak of *Nanga Parbat*, the most westerly peak of the Himālayas proper, it turns sharply to the south-west, breaking through a magnificent gorge with cliffs at both sides over 14,000 ft. in height. From this point it continues its flow in a south-westerly direction till it reaches

the sea. Just at its bend it receives the waters of the **Gilgit** river from the west. Two hundred miles further on, near Attock, it is joined by the **Kābul** river, which, with its tributaries the **Swāt**, the **Panjkora**, and the **Chitrāl**, drains the eastern slopes of the *Hindu Kush* and the *Chitral Hills*. Other important affluents from the west are the **Kuram**, with its tributary the **Tochi**, and the **Gomal**.

40. But the great affluents of the Indus are from the east. They are five in number, and, watering the Punjab, give that Province its name—*Panj-ab*, five rivers. The **Jhelum** is the most westerly of these, and pours its waters into the **Chenāb**, which, further down, also receives the

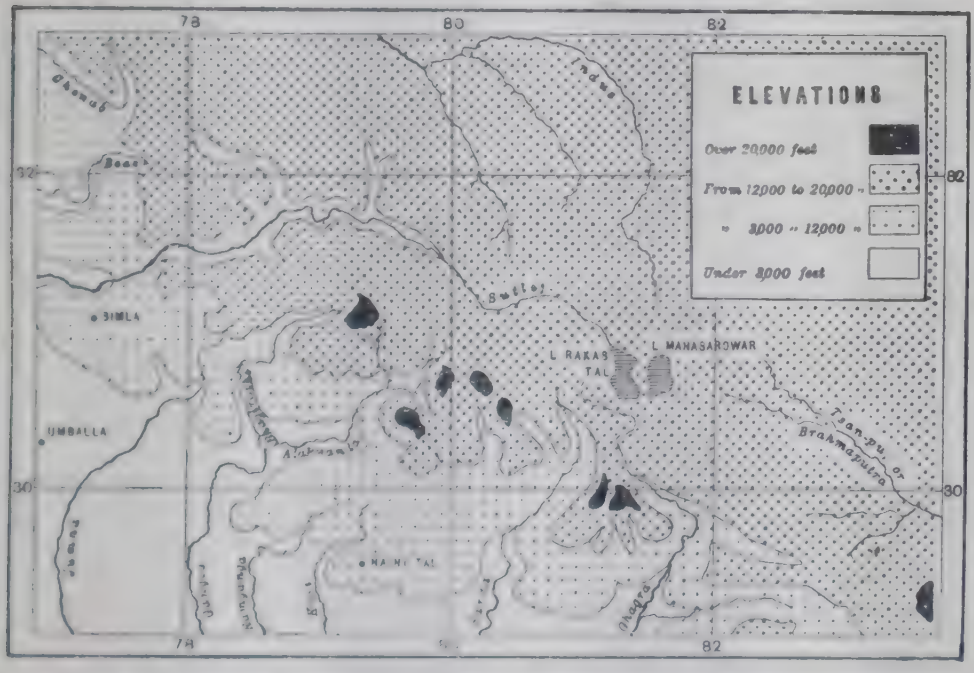


Fig. 7. Showing Lake Mānsarowar and the rise of the great northern rivers.

waters of the **Rāvi**. All these take their rise in the Himālayas, and, like the Indus, flow at first in a north-westerly direction. The **Sutlej**, the most easterly of the five rivers of the Punjab, flows from *Rākas Tal*, a lake to the west of *Mānasarowar*, and, breaking through a gorge in the Himālayas north of Simla, enters the Punjab from the east.

When half way on its course to the Indus it is joined by the **Beās,** which rises on the southern slopes of the hills not far from the source of the Chenāb. At this point the Sutlej changes its course, which has hitherto been almost westerly, and after flowing for 300 miles in a south-westerly direction, joins the Chenāb. One channel, called the **Panjnad,** thus carries the water of all five rivers to the Indus.

41. All these rivers being fed by the melting snows, as well as by the monsoon rains, are in flood in the late summer. After their emergence from the hills their course lies across an almost level alluvial plain composed for the most part of a soft loam. They therefore carve for themselves numerous wide and shallow channels, which they constantly tend to change. This is true also of the Indus in many parts of its course, as well as of most of the tributaries of the Ganges. In the broad plain there are no hills to confine them, and the soft earth of which their banks are composed is unable to withstand the erosive action of their flood waters.

42. From its confluence with the Panjnad the Indus flows midway between the frontier hills of Baluchistān and the region of the scantiest rainfall in India, the **Thar** or **Indian Desert.** It has, therefore, no further affluents of importance and in the lower part of its course *gives* more water than it *receives*. It does for Sind precisely what the Nile does for Egypt, watering and fertilizing the land for many miles on both sides. By the vast amount of silt which for ages it has brought down from the mountains it has built up for itself a bed higher than the surrounding country. Streams therefore flow from it instead of into it. This makes irrigation from the Indus for the most part exceedingly simple and easy, but at the same time it increases the danger of disastrous floods. The same force which has built the broad soft banks can also destroy them. When the river is in flood the swirling waters often make vast breaches in them, and widespread inundations with great loss of life and property are the result. Occasionally, also, the river will in consequence change its course, or

make for itself a subsidiary channel often at a considerable distance from the main stream. At *Sukkur*, about 300 miles from its mouth, the river narrows into a rocky channel, and is spanned by a great railway bridge. Two hundred miles further south the Delta begins, and the river pours its waters into the Arabian Sea by many ever-shifting distributaries.

43. **The Brahmaputra.** This river, called the **Tsan-pu** north of the Himālayas, enfolds the eastern portion of the great mountain chain just as the Indus enfolds the western. Rising in the neighbourhood of Lake Mānasarowar, it flows almost due east for a distance of almost 700 miles; then, bending sharply round the mountains, takes an almost westerly course through the narrow valley of Assam. On its way it receives the southern drainage of the Himālayas and the northern and western drainage of the Pātkai and Khāsi Hills. West of the Khāsis it turns south, and almost immediately begins to throw off distributaries. About 100 miles from its mouth its main stream unites one of the chief distributaries of the Ganges. Their united waters reach the Bay of Bengal through two main channels known as the **Pudda** (or **Padma**) and the **Arialkhan** rivers. Two of the larger distributaries of the Brahmaputra, thrown off before its junction with the Ganges, flow into the **Meghnā**, a river which drains the southern slopes of the Khāsi Hills, and the western slopes of the Nāgās and Lushais. The Meghnā then unites with the Pudda fifty miles from the sea.

44. Throughout its whole course from the north-east of Assam the Brahmaputra cuts for itself a multitude of channels, spreading itself in parts over a width of many miles and forming numerous river islands, most of which are covered with verdure in the dry season but completely submerged when the river is in flood.

45. **The Ganges.** The Ganges system is by far the most important river system in India. Not only is its basin the largest, but it includes the richest and most populous provinces of the Empire, provinces whose wealth and prosperity are in great part the gift of the river.

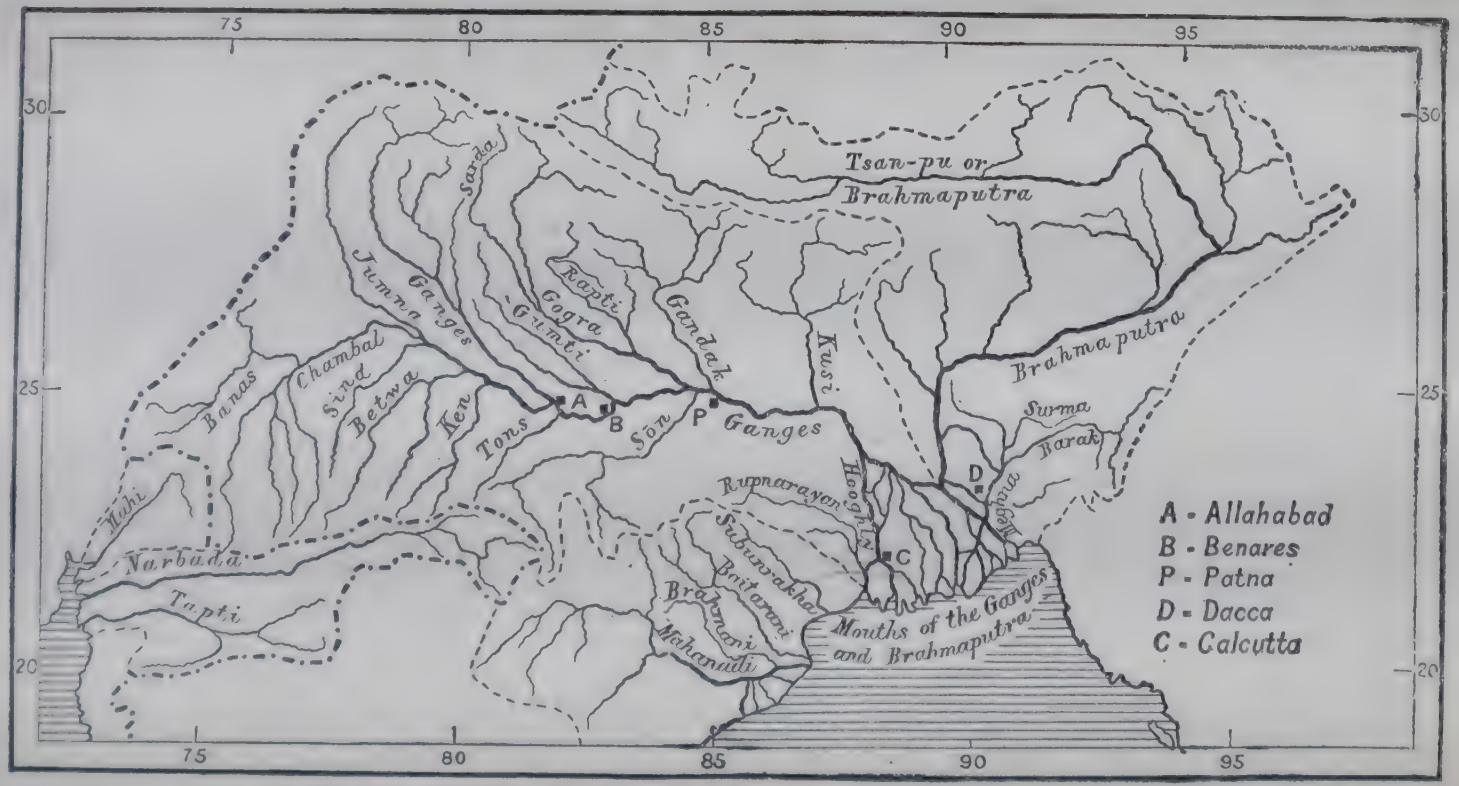


Fig. 10. Showing the basins of the Ganges and Brahmaputra and the northern peninsular rivers. The basins are divided by dotted lines, the heavier dots showing the waterparting between East and West.

46. The **Ganges** proper is formed in Garhwāl by the union of two rivers (see Fig. 9, page 25), the **Bhāgīrathi**, which rises among the glaciers of Gangotri and is often called the Ganges, and the **Alaknānda**, which rises to the north-west of the great peak Nānda Devī and breaks through the Garhwāl Himālayas. The Alaknānda is much the larger of these confluents. The river thus formed flows for 50 miles in a south-westerly direction, and then gradually bends round to the south and south-east, maintaining the latter direction till it has passed Allahābād. On its eastern and northern side it receives many tributaries, the chief of which is the **Rāmgangā**, which also rises in Garhwāl. From the west and south it receives no tributary of importance till it reaches Allahābād, where it is joined by the **Jumna**.

47. The **Jumna** also takes its rise north of Garhwāl and west of the Bhāgīrathi. In its course it describes a curve similar to that of the Ganges, and for the greater part of its way to Allahābād maintains a distance of from 50 to 80 miles west of that river. Unlike the Ganges, however, its main affluents are from the west and south. The most important of these is the **Chambal** which drains the north-eastern slopes of the Arāvallis and Vindhyas.

48. From Allahābād the Ganges flows eastwards, passing Benares, and a few miles further on is joined by the **Gumti**, which descends from the frontiers of Nepāl. A hundred miles lower down it receives the waters of the **Gogra**, which rises near Lake Rākas Tāl and breaks through a gorge in the mountains. On its way the Gogra receives the waters of the **Sarda** and the **Rapti**, and by the time it reaches the Ganges it rivals it in volume. Within the next 30 miles the Ganges is joined by the **Sōn** from the south and the **Gandak** from the north, and when north of the Rājmahāl Hills it receives the **Kūsi** from the north. Both the Gandak and the Kūsi rise north of the Himālayas and break through the mountain chain, while the numerous feeders of the Sōn drain the rocky highlands of the Central Provinces and Chotā Nāgpur. After passing the Rājmahāl Hills the Ganges bends toward the south-east, and

soon begins to throw off its distributaries to the south. The first of these is the **Bhāgīrathi,** which lower down becomes the **Hooghly,** and the point at which the Bhāgīrathi branches off is the beginning of the delta. The main stream still continues in a south-easterly direction, till south of Pabna it divides into two almost equal streams, one of which, the **Madhumatī,** or **Haringāta,** takes a more southerly course to the sea, and the other, the **Pudda** (or **Padma**) follows a more easterly course to Goālānda, where it unites with the Brahmaputra.

49. The northern and southern tributaries of the Ganges differ greatly in character. The former are fed, as we have seen, not only by the heavy rains which fall on the Himālayan slopes, but also by the melting snows. They are therefore much more constant than they would be if dependent on the rains alone. Though in flood in July and August they continue to bring down a fair quantity of water through the greater part of the year. The southern tributaries have no snow reservoirs to draw upon. Their basins have also a much smaller rainfall than the Himālayas, particularly in the west. The ground they drain is also for the most part rocky, off which the water flows with great rapidity. The rivers, therefore, rise rapidly as soon as the summer monsoon brings its store of rain, and fall almost as rapidly when the rain ceases. When in flood they rival the northern rivers in volume, but for the greater part of the year they are little more than rivulets. For this reason they are of much less value for irrigation purposes than the Himālayan rivers. While (as we shall presently see) there are vast irrigation systems that draw their supplies from the latter, the systems dependent on the southern tributaries are few and small. The Ganges is also of immense value as the chief waterway of north India. Its volume is always sufficient to bear upon its bosom a vast host of boats of every description. At the various registering towns along its course over 130,000 river boats of various kinds are licensed to ply upon its waters. The river thus brings down a large part of the immense produce of the rich provinces which it traverses.

(10) The Rivers of the Peninsula

50. Most of the great rivers of the peninsula pour their waters into the Bay of Bengal. In the map on page 28 the water-parting between east and west is shown by a line of heavier dots extending from north of the Himālayas to Cape Comorin. It will be noticed that from the southern point this line follows the Western Ghāts, till, from the northern extremity of this range, it strikes sharply westwards where the narrow basins of the Tāptī and Narbadā stretch far across the peninsula, the latter nearly two-thirds of the way to the Bay of Bengal. With these two exceptions the rivers which flow westwards are small and of little moment. The great rivers of the peninsula, though rising as a rule within a few miles of the west coast, make their way eastwards, gathering volume as they go.

51. **The Narbadā,** rising near *Mount Amarkantak,* in the north of the Central Provinces, and a little to the east of Chotā Nāgpur, takes an almost straight course to the Gulf of Cambay. It receives few tributaries, and no large ones. Like the Ganges it is a sacred river of the Hindus, and from its source to its mouth it is by very far the most beautiful river in India. "Of all the rivers in India," says Sir Lepel Griffin, "there is none which is surrounded by more romance and mystic interest; whilst for strange and fantastic beauty it takes high rank among the celebrated rivers of the world."

52. **The Tāptī** rises south of the Mahādeo range of hills, and flow westward along the northern valley. Debouching through a gorge at their western extremity, it is joined by the **Pūrna** which drains the southern slopes of the same hills. Like the Narbadā, from which it is separated by the Sātpura range, the Tāptī flows westwards and empties itself into the Gulf of Cambay, a little to the north of the ancient port of Surat.

53. The four great rivers of peninsular India which discharge into the Bay of Bengal are the **Mahānadī,** the **Godāvari,** the **Kistna,** and the **Cauvery.**

54. **The Mahānadī.** The basin of the Mahānadī meets that of the Narbadā, and one of its tributaries takes its rise, like that river, on the slopes of Mt. Amarkantak. The Mahānadī itself rises on the northern slopes of the hills that form the northern boundary of the State of Bastar in the Central Provinces. It flows at first in a northerly direction till, having received its chief tributary, the **Seonath,** from the west, it turns to the east and flows east and south, past Sambalpur. Its numerous affluents drain a large tract of hilly country, and in the rainy season the river is of unusual volume for its length. When in flood it almost equals the Ganges. But, like all the Vindhyan rivers, it rises quickly and quickly falls again. The Mahānadī breaks through the hills by a gorge 40 miles long and of great beauty, and, after passing Cuttack, divides into the numerous channels of its delta. The river brings down a very large quantity of silt, and the delta is extensive and rapidly increasing.

55. **The Godāvari** rises in the Western Ghāts a little north of Bombay. It flows through the Nizām's Dominions, and for more than 350 miles its various tributaries form the northern boundary of that State. The general course of the Godāvari is west-south-west for the first two-thirds of its length, then it turns to the south-west and maintains that direction till it reaches the sea. Its main tributary on the south is the **Mānjira,** which rises in the Bhir country on the borders of Bombay. From the north, just at the point where it bends more to the south, it receives the waters of the **Prānhita,** a river almost as large as itself. The Prānhita is formed by the union of three rivers, the **Paingangā** from the west, the **Wardhā** from the north-west, and the **Waingangā** from the north. Further on it receives from the north-east the **Indrāvati,** which rises on the western slopes of the Eastern Ghāts and drains the unhealthy jungles of Bastar. In their passage through the Ghāts the waters of the Godāvari are confined for 20 miles within a deep and narrow channel, and the scenery on both sides is wild and grand. Shortly after its emergence from the Ghāts it broadens into a vast and noble river, and at

Rajahmundry it is crossed by a railway bridge $1\frac{3}{4}$ miles long. At Dowlaishweram, the apex of its delta, the river divides into three main distributaries and many smaller ones, and so reaches the sea.

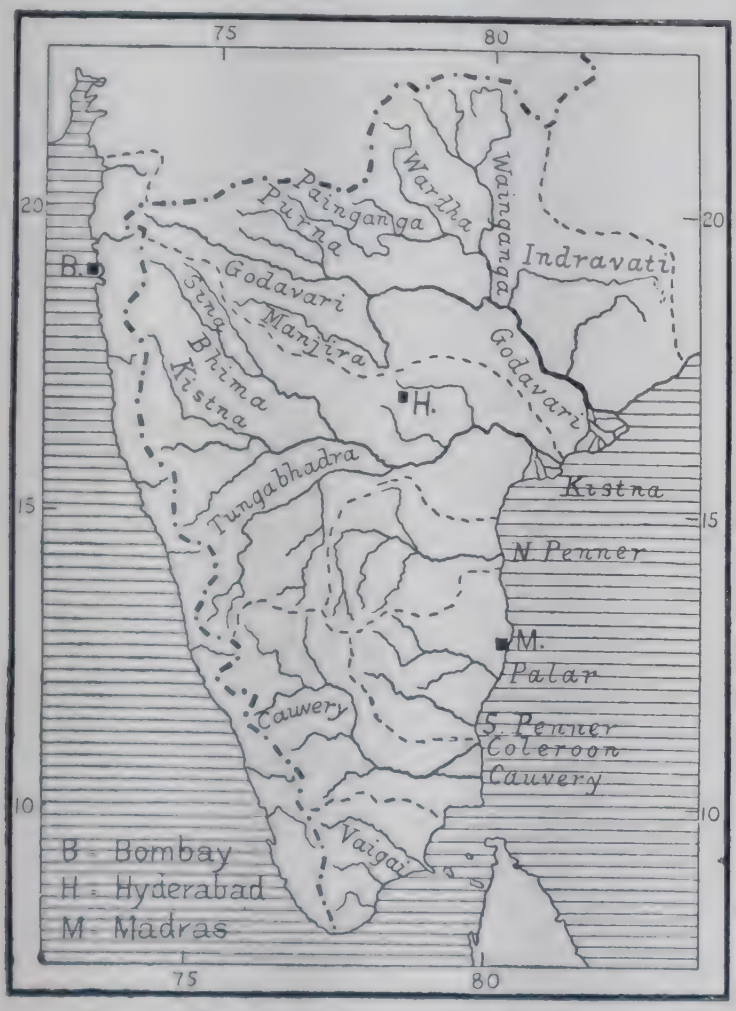


Fig. 11. Basins of the chief rivers of the Peninsula.

56. **The Kistna** and its tributaries receive the eastern drainage of considerably more than one-half of the whole length of the Western Ghāts. The Kistna basin, unlike that of the Godāvari, is broadest towards the west, and gradually narrows as it approaches the Bay of Bengal.

The Kistna rises near Mahābaleshwar and flows first in a southerly direction. It has two great tributaries, the **Bhīma** from the north and the **Tungabhadra** from the south. The Bhīma rises to the north of Poona, and after flowing south-east through Bombay and the Nizām's Dominions, joins the Kistna a little to the north of Raichur. The Tungabhadra is formed by the union of two rivers, the **Tunga** and the **Bhadra,** both of which rise in the west of the Mysore State. They unite within the boundaries of that State, and, flowing in a north-easterly direction, separate the Presidency of Madras first from Bombay and then from Hyderābād. After receiving the waters of the Tungabhadra the Kistna turns to the north-east and continues its flow in that direction till it has passed the *Nallamalai Hills*, which cut it off from the plain of the eastern sea-board. Then it turns sharply to the south-east and so reaches the sea.

57. **The Cauvery** and its tributaries drain the whole of southern Mysore, the eastern slopes of the Nīlgiris and Anamalais, and the northern and eastern slopes of the Palnis. It flows through some of the most productive and populous districts of South India, notably Tanjore, which it waters by means of extensive and ancient irrigation works. After passing Trichinopoly its delta begins. The river divides into two arms, the smaller of which, still called the **Cauvery,** flows almost due east, and divides again into several channels before it reaches the sea. The larger, called the **Coleroon,** flows in a north-easterly direction, and empties itself into the sea half way between Pondicherry and Negapatam.

A few miles from the city of Mysore the Cauvery divides, and the two arms, uniting again lower down, enclose the river island of **Seringapatam,** the famous stronghold at which Tippu Sahib made his last stand. Further down, two similar islands are formed, both held to be of great sanctity by Hindus. These are the island of **Sivasamundram,** at the southern frontier of Mysore, and the island of **Srirangam,** near Trichinopoly, the site of one of the largest and most famous Hindu temples.

58. The peninsular rivers depend for their supply of water upon the rainfall alone. For the most part also they traverse rocky land with a comparatively shallow soil into which little of the water sinks. During the dry season the river beds are, as a rule, nothing but vast expanses of sand, with a few sluggish and shallow rivulets. But when the rains begin, these rivers rise with extraordinary rapidity, coming down from the hilly country in vast and ever increasing volume and with a swift and irresistible flow. Sometimes the "freshes" come down with such suddenness, and in such volume, as to overwhelm travellers who may be crossing their broad bed. Breaking loose from their banks these rivers often flood the country for many miles around. But, except in their delta stage, they do not tend, like the rivers of the great northern plain, to change their course or cut for themselves new channels. When the flood subsides they sink again into their old beds. Because of the violence of their floods their action on the land is unusually great. Their flood waters are thick and muddy, and often discolour the sea for many miles from their mouths. Where the speed of their current is checked this mud, the washings of the inland hills, is deposited. Along the eastern coast this process has been going on for countless ages, for the Eastern Ghāts, as we have seen, share with the Arāvallis the honour of being the oldest hills in India. In the course of ages these hills have been worn down, and with their washings the rivers have built up a broad and fertile alluvial plain along the sea-board, which they are ever increasing and enriching.

(11) The River Systems of Burma

59. We have seen that the mountains of the Indo Chinese peninsula run from north to south, stretching southwards in almost parallel ranges, and in ever diminishing altitudes, from the great mountain systems of the north. Consequently, the great rivers of Burma which separate these ranges all take a southerly course. They are the **Irrawaddy,** with its great tributary the **Chindwin,** the **Sittang,** and the **Salwin.**

60. The Irrawaddy drains the greater part of Burma. It is a noble river, navigable by light draught steamers as far as Bhamo, 700 miles from the sea, and by smaller craft still further. Being snow fed it rises and falls, but is never very low. Till railways were constructed it was almost the only highway of commerce between Upper Burma

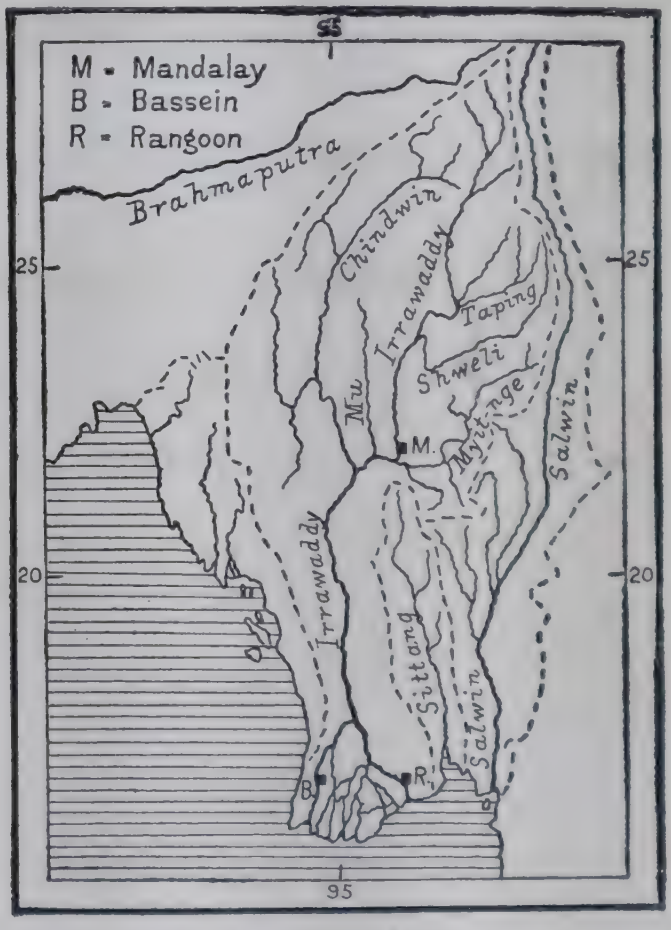


Fig. 12. Rivers of Burma.

and the coast, and it is still the chief. The Irrawaddy rises in the rugged mountains east of the bend of the Brahmaputra, and with the exception of about 60 miles after passing Bhamo, and again for a similar distance after passing Mandalay, when it turns in each case to the west, its general course is almost due south. At a distance of

800 miles from the sea it is more than half a mile wide, and it maintains a width of from half a mile to a mile and a half all the way to its delta, except in four places where it breaks through defiles in the mountains, and, amid scenery of surpassing beauty, narrows into deep rocky channels. In one of these the river is only 600 ft. wide, but over 1,000 ft. deep. A little below Mandalay the Irrawaddy is joined by the **Myinge** which drains the Shan Hills to the north-east. Thirty miles further down it receives the waters of its main tributary, the **Chindwin.** Rising, like the Irrawaddy itself, east of the bend of the Brahmaputra, the Chindwin drains the eastern slopes of the Pātkai and Nāgā Hills, and the Arakan Yoma. In its lower course, before its junction with the Irrawaddy, it waters a broad and fertile valley. A little below the point of confluence the Irrawaddy bends gradually to the south again. More than 100 miles from the sea the delta begins, and the river finds its way to the Gulf of Martaban through fourteen channels. On the most easterly of these distributaries stands the port of Rangoon, the chief port of Burma, and on the most westerly, the smaller port of Bassein.

61. The basin of the **Sittang** is separated from that of the Irrawaddy on the west by the Pegu Yoma, and from that of the Salwīn on the east by the Poung-loung Hills, both of them fairly continuous, though low, ranges, which run north and south, and enclose a rich and fertile valley from 50 to 90 miles in width. A glance at the map will show that the basin of the Irrawaddy meets that of the Salwīn, about 100 miles south of Mandalay. The Sittang is, therefore, a comparatively short river, and being shallow at its mouth it is useless for navigation. It is subject also to a severe tidal bore. The tidal wave, concentrating in the apex of the gulf, rushes up the broad estuary as a wall of water, often from fifteen to twenty feet in height. The Sittang valley is flat, and provides an excellent route for the railway to Mandalay.

62. The **Salwin,** like so many of the rivers of north India, rises amid the snows and lakes of Tibet. Bending to the south, 200 miles east of the Brahmaputra, it makes its long journey

to the Gulf of Martaban confined between ranges of hills which in the north narrow its basin to a few miles. Throughout its whole course it has a rocky bed. At seasons of flood, when the Tibetan snows are melting, the Salwīn brings down more water than the Irrawaddy. But numerous rocky rapids on its course make navigation impossible for more than 100 miles from its mouth.

(12) Coast Line and Harbours

63. The total coast line of India and Burma, from Cape Monze on the western point of Sind to Victoria Point in the south of Tenasserim, is slightly over 4,800 miles in length. Seeing, however, that the peninsula of India stretches southwards from Latitude 25° N. for nearly 1,200 miles, forming almost an equilateral triangle with that parallel as its base, and that Burma stretches about the same distance to the south on the other side of the Bay of Bengal, this long coast line is relatively short. It is comparatively uniform and regular, and is broken by few indentations of any magnitude. For the greater part of its length a sandy and almost level coast strip is washed by shallow seas. The waves, rolling in unbroken from the open ocean, break in the shallow water in long lines of surf, which even in fine weather are a difficulty and danger to small boats, and in stormy weather lash the shore with almost irresistible fury and make it impossible of approach. This is particularly the case on the south-east coast, but is more or less true all round the peninsula. In natural harbours India is unusually poor. Vast stretches of coast present no convenience or shelter whatever for shipping, neither land-locked bays nor navigable estuaries. India could therefore never become a great maritime country, and all her foreign sea-borne trade is carried in the ships of other nations.

64. Both the east and the west coasts of India are greatly affected by the **surface currents,** or **drifts,** in the surrounding seas, which are induced by the steady seasonal winds. During the south-west monsoon the currents run

along the west coast of the peninsula from north to south, and along the east coast from south to north. During the north-east monsoon these directions are reversed. These currents exercise considerable erosive power, and at the same time they wash up, and move along the coast, vast quantities of sand, which is deposited wherever the force of the current is checked by its entry into a bay, or by its conflict with the river currents prolonged into the sea. The influence of these drifts is thus twofold. Where they beat upon an exposed promontory they gradually eat into the land. When they flow into a confined bay they wash more sand in than they can wash out, and slowly tend to fill the bay up. Striking examples of these two effects are to be found on the west coast, where the currents exert on the whole a more powerful influence than on the east. The extreme north-western point of Kāthiāwār, which is exposed to the full effect of the south-west monsoon drift as it bends round the north of the Arabian Sea, is being rapidly worn away, and the sea is steadily encroaching on the land. On the other hand, the Gulfs of Cutch and Cambay are rapidly silting up. One curious result of these drifts, seen almost equally along both coasts, is the formation of long banks of sand and mud, or bars, as they are called, a little distance from the mouths of all rivers. These bars are just beyond the scouring power of the flood water of the river, and they constitute an effectual barrier to navigation.

Fig. 13. Karachi Harbour.

65. Beginning at the extreme west of India we have the excellent harbour of **Karāchi**, a natural bay formed by a projecting ridge of rock and greatly improved by an extensive breakwater. Karāchi is about 12 miles west

of the most westerly outlet of the Indus. Being the nearest Indian port to Europe, and having direct railway communication with north India (by a bridge across the Indus at Sukkur), it attracts to itself the greater part of the sea-borne trade of Rājputāna and the Punjab, and is a rapidly-growing port. Owing to the steady silting up of the entrance, however, the channel has to be incessantly dredged.

66. For 120 miles south-east of Karāchi extends the delta of the river Indus, the shifting channels of which are navigable only by small craft. At one time the chief channel of the Indus discharged its waters into the **Great Rann of Cutch,** which separates the island of Cutch from Sind. Between Sind and the promontory of Kāthiāwār on the south are the **Little Rann of Cutch** and the **Gulf of Cutch.** The Ranns are shown as arms of the sea on all maps, but they are no more than vast salt morasses, covered with shallow water only in the wet season, and in the dry months for the most part baked dry and hard. They are the haunt of wild asses, which wander about in herds of 50 or 60, and are so timid and fleet that they can seldom be approached. The Ranns are *sea-swamps in process of natural reclamation.* The Gulf of Cutch is also exceedingly shallow, and when the tide is low much of it is bare sand. South-east of Kāthiāwār is the **Gulf of Cambay,** which, as we have seen, is gradually silting up. The port of Cambay at the north of the Gulf has lost almost all its sea trade, and the more famous ports of **Broach,** on the Narbadā, and **Surat,** on the Tāpti, are yearly being rendered more difficult of access from the same cause. **Surat** was at one time the wealthiest and most famous port in India.

67. About 150 miles south of the Gulf of Cambay is the excellent natural harbour of **Bombay.** It is protected by the islands of Bombay and Salsette, and offers abundant and safe anchorage. But owing to the constant deposit of silt at its entrance great care has to be taken to keep it open, and the largest vessels have to enter with caution. Bombay is admirably situated as the principal port for

communication with the west, and is the chief mail route. It is almost equidistant from the north, south, and east of India, and is accessible by rail from all parts.

68. From Bombay south to Cape Comorin, though there are many small sea-ports, there are only two harbours that offer a safe anchorage in bad weather for vessels of large size. These are **Goa** and **Kārwār.** The former is now served by the Southern Marāthā Railway, and is growing in importance. The rest are "fair weather ports" only, and many of them are quite unapproachable when the south-west monsoon is blowing in force. Near the south of the peninsula there is an extensive system of **backwaters** or **lagoons,** separated from the sea by broad banks of sand through which occasional openings give an outlet for flood water in the rains, and an inlet for the sea. In ancient days it is probable that these channels, as well as the lagoons themselves, were of much greater depth, and admitted ships of fair size. Now, however, though of inestimable value as inland waterways, these lagoons are useless for seafaring purposes.

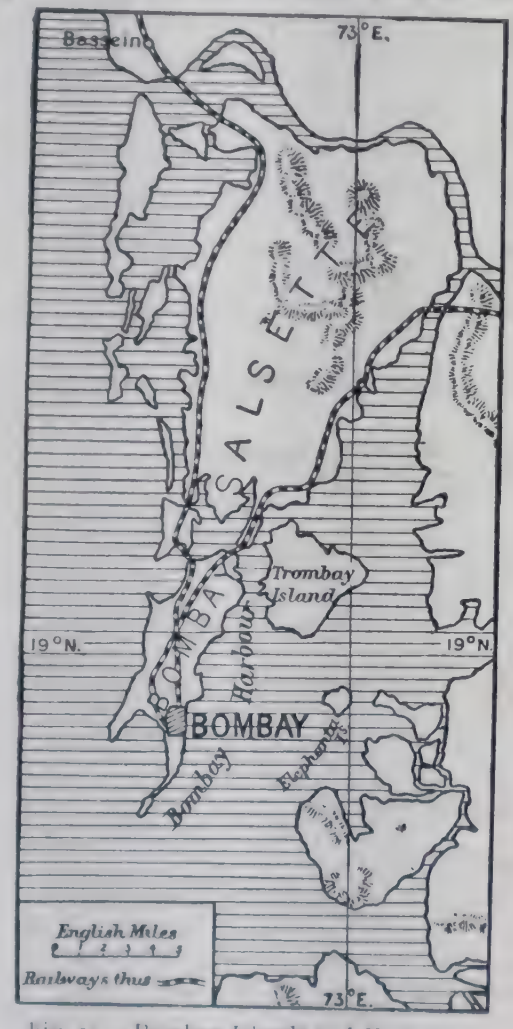


Fig. 14. Bombay Islands and Harbour.

69. Rounding **Cape Comorin** we enter the **Gulf of Manar,** on the western shore of which stands the small port of **Tuticorin.** The water is exceedingly shallow, and

steamers have to anchor some miles out, but in spite of this Tuticorin has come to be of some importance as the chief peninsular port for communication with Ceylon. Northward are the **Palk Straits,** almost blocked by the islands of **Rāmeswaram** on the west and **Manar** on the east, and a long sand bank which almost unites the two. On the landward side of the two islands are shallow passages known as the **Manar Passage** and the **Pāmban Passage.** Till a few years ago neither of them was more than six feet deep, and although they have recently been deepened and widened, they offer no route for large ocean steamers, which have to pass round the south of Ceylon.

70. The west coast of Ceylon, like that of the peninsula itself, is low and sandy, and is subject to the same silting. There are extensive backwaters, in many respects similar to those on the west coast of India, and, like them, of great value for boat traffic. The port of **Colombo,** nearly 100 miles from the most southerly point of the island, is rapidly becoming one of the most important ports of call in Asia. It has a fair natural harbour, which has been very greatly improved by the construction of a long breakwater. As a port of call, and the point where almost all the great steamship lines traversing the Indian Ocean converge, Colombo has superseded **Galle** in the south of the island, though **Galle Bay** forms an excellent and fairly safe harbour.

Fig. 15. Point de Galle and Bay.

71. The east coast of Ceylon contrasts sharply with the west, as well as with the entire coast of the peninsula, being everywhere rocky and descending quickly to the sea. The depth of water increases with unusual rapidity, a depth

of 12,000 ft., or over 2¼ miles, being reached within 50 miles of the shore. There are several excellent and safe natural harbours, the chief of which is **Trincomallee Bay**, large enough, it is said, to accommodate all the navies of the world, and to be a safe refuge for ships of the largest order. Trincomallee is a British naval station; though in this respect it is of comparatively little moment, being off the main lines of sea communication.

72. The east coast of India, from Pāmban northwards to the Hooghly, has not a single natural harbour of any kind, and offers no shelter whatever to shipping in the furious storms that at particular seasons prevail in the Bay of Bengal. It is an unbroken stretch of inhospitable surf-beaten sands, or low, deltaic, mud islands. Across the mouths of all the great rivers bars stretch, which effectually close them to everything but boats of low draught. There are several ports along the coast at which there is a fair amount of shipping trade, but coasting steamers have to anchor far out to sea—in some places five or six miles—and in bad weather the open sea is their only refuge. At **Madras** vast breakwaters have been constructed of solid blocks of concrete which enclose a portion of the roadstead. In good weather these secure for ships a smooth-water anchorage where they can load and unload without the inconvenience that they previously suffered from the restless waves. But as a place of refuge from bad weather the harbour thus made is useless, or worse than useless. The action of the surface drifts on the east coast is similar to that on the west, but as a rule not quite so powerful. In some places the land is gaining at the expense of the sea through the piling up of sand, and at others is being worn away by steady erosion. A remarkable instance of both these effects has been seen at Madras since the erection of the breakwaters. On the south side of the harbour the coast line is being pushed out to sea, while on the north side the sea is eating into the land.

73. Of the many distributaries that bring the waters of the Ganges to the sea, the only ones that are navigable for anything larger than river boats are the **Hooghly** and the

Mutla. About 80 miles up the Hooghly stands **Calcutta,** the metropolis and premier port of India. The river is, however, exceedingly difficult to navigate, and in one part perilous. At the bend in its course, where it receives the waters of the Rupnārāyan the **James and Mary Sands** have been formed. This is the most dangerous bank of quick-

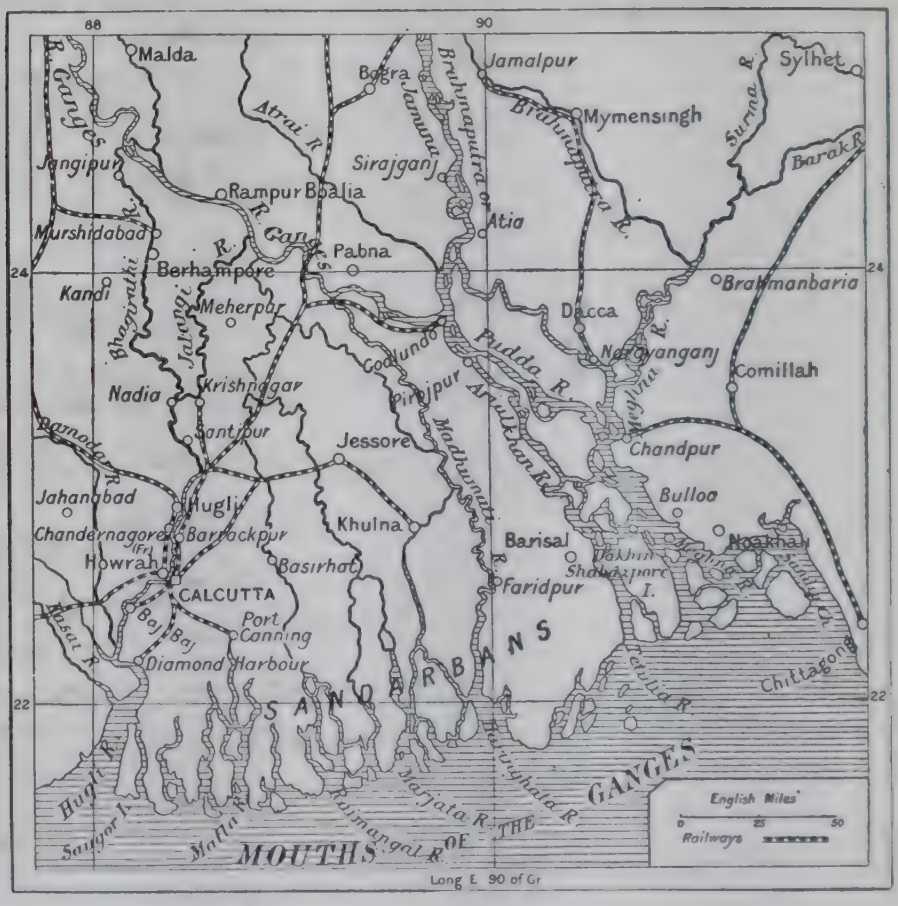


Fig. 16. The Ganges-Brahmaputra Delta.

sands in the world. Vessels that strike it are swallowed up with appalling rapidity. Calcutta, therefore, holds its position as the chief port of India more because it taps the richest and most productive of all the Indian Provinces than by reason of its excellence as a sea-port, in which respect it is far surpassed both by Bombay and Karāchi.

In olden times the ships of the East India Company used to go no further up the river than **Diamond Harbour,** which still enjoys a certain amount of trade, and is now connected with Calcutta by railway. About forty years ago an attempt was made to relieve Calcutta of some of its shipping, which often greatly crowds the river, by opening a new port, called **Port Canning,** on the *Mutla* river, a channel of the delta, about 25 miles east of the Hooghly. Port Canning also is connected by rail with Calcutta, from which it is distant about 20 miles, but as a port it has not developed as was at first confidently expected.

74. From the Hooghly for a distance of 200 miles to the eastward stretch the low mud islands of the delta. In many parts, particularly in the east, these islands are cultivated, but they are mostly covered with low trees and shrubs, and are infested by tigers and crocodiles. The entire district is known as the **Sandarbans,** and is subject to disastrous floods both from the waters of the rivers and from storm waves. One such wave which swept over the Sandarbans about thirty years ago caused an immense loss, both of life and property, no fewer than 100,000 people being drowned. None of the channels of the delta are navigable, save for river boats, till we come to the *Meghna* in the east, which will allow of the passage of river steamers at all times, and is an important waterway to Dacca. The Meghnā is, however, subject to a severe tidal bore which makes its navigation difficult and dangerous. The Hooghly is subject to the same phenomenon, but not to so serious a degree as the Meghnā.

75. The eastern shores of the Bay of Bengal are totally different from the western, being fringed with innumerable small rocky islands, mostly volcanic in origin. The sea bed immediately adjacent to the land being in most places rocky, the river mouths are not so greatly blocked with sand bars as is the case almost all round the Indian peninsula. The rivers are therefore more open to sea traffic. For example, the comparatively small river **Kaludān,** at the mouth of which is the safe and well-protected port of **Akyab,** is freely open to the sea, in spite of a small bar,

and can be navigated for over 50 miles by vessels of 400 or 500 tons burden. **Akyab** is the only port of any consequence north of Cape Negrais. **Bassein** and **Rangoon** are on channels of the Irrawaddy delta, and **Moulmein** is at the mouth of the Salwīn. All these are easily accessible, and give safe anchorages to the largest vessels. This is also true of the smaller ports on the Tenasserim coast, **Amherst Tavoy,** and **Mergui.**

(13) Islands

76. With the exception of **Ceylon**, which does not belong to the Indian Empire and will be treated separately, the Islands of India are of comparatively little moment. They are, however, exceedingly numerous, especially off the coast of Burma, and though small, their united coast-line exceeds 3,000 miles in length. The total coast-line of the Indian Empire is 8,415 miles.

77. **Salsette** and **Bombay** are now connected with the mainland by a causeway, and can hardly be considered islands. **Elephanta** and **Trombay** are within the harbour of Bombay. Other smaller islands, mostly composed of volcanic rock, belong to the same group. The **Laccadive and Maldive Islands** are, as we have seen, remnants of the broad belt of land which, in far back geological ages, united India and South Africa. Or, more accurately, they are coral structures raised slowly by the coral polyp (which can only live comparatively near the surface of the water) upon the gradually submerging land. The **Laccadives** are about 200 miles west of the Malabar coast, and belong to India. The **Maldives** are 300 miles south-west of Cape Comorin, and are under a Sultan tributary to Ceylon. Nine of the Laccadive Islands are inhabited, and seventeen of the Maldives, the population being respectively about 10,000 and 30,000. **Rāmeswaram** and **Manar** are two islands lying between Ceylon and India, the former belonging to India, the latter to Ceylon. **Rāmeswaram** is a noted place of Hindu pilgrimage. Of the many low islands at the mouths of the Ganges, Brahmaputra and Meghnā, the only ones of any moment are **Saugor** island in the west, and **Shabazpur** and **Sandip** islands in the east.

78. The islands off the Burmese coast are totally different from those to the north of the Bay of Bengal, being mostly rocky, and volcanic in their origin. They differ also from the Laccadives and Maldives, inasmuch as, with the single exception of some of the **Coco Islands,** there is hardly any coral formation to be found among them. North of Cape Negrais the only islands of any moment, among the many hundreds with which the coast is studded, are **Barongo** and **Savage Island,** which protect the port of Akyab, and the larger islands of **Ramri** and **Cheduba** a little further to the south. From Cape Negrais a well-defined submarine ridge runs southwards to Sumatra.

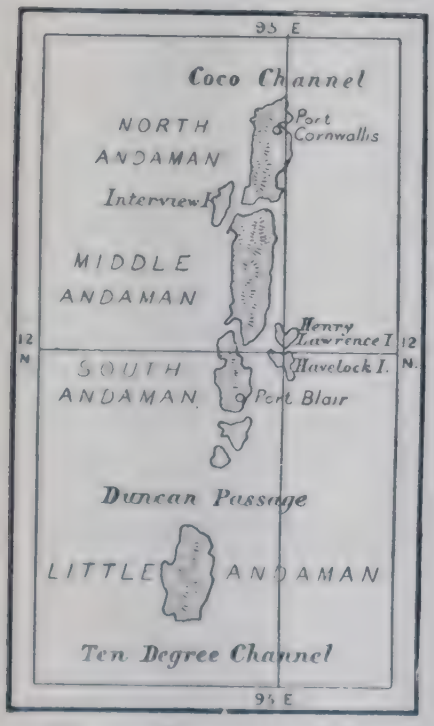


Fig. 17. The Andaman Isles.

About 75 miles south of the cape it crops up in the **Preparis Isles,** a group of minute volcanic peaks. Fifty miles further south are the **Coco Islands,** similar in every way except that they contain a minute volcano that is still very slightly active. Thirty-five miles south of the Cocos the **Andaman Islands** begin, a beautiful and in many ways important group, consisting of four large islands and many small ones, and stretching from north to south for a distance of over 200 miles. Further south again are the **Nicobars.** The Andamans and Nicobars constitute a Chief-Commissionership, and will claim attention later. They have many excellent natural harbours, well protected and with good anchorages. The same is also true of the **Mergui Archipelago,** which consists of many hundreds of rocky islands skirting the whole length of the Tenasserim coast.

CHAPTER II

CLIMATE OF INDIA

79. BLANFORD remarks that we may speak of the *climates* but not of the *climate* of India, for "the world itself affords no greater contrast than is to be met with at one and the same time within its limits." It would be a vain task to describe the climate of every part of India, and any attempt to do so is unnecessary. Climate is everywhere the result of certain conditions whose influence is well understood. The presence or absence of these conditions enables us readily to explain and understand all climatic differences.

(1) Temperature

80. The Tropic of Cancer crosses India almost midway between its northern and southern points. Passing through Cutch on the west and the Gangetic Delta on the east, it very nearly marks the division between peninsular and continental India. The whole of the peninsula is within the tropics, and Cape Comorin is just over 8° north of the equator. The Indo-Gangetic plain, on the other hand, lies outside the tropics, but near enough to be within the region of greatest solar radiation in the summer months. In the absence of all other modifying causes, therefore, we should expect the south of the peninsula to have the highest mean annual temperature, and the lowest annual range. Passing north we should expect the mean annual temperature steadily to diminish, and the mean annual range to increase; while from 2° south of the Tropic to 6° or 8° north of it we should expect to find the summer maxima higher than in any other part of India. In the main this is the case, but in India, as in all other countries, the presence or absence of water, the prevailing winds, the proximity of mountain chains, elevation and aspect often make the ordinary temperature of places in the same latitude totally different.

81. It is easy to see how very greatly the climate of India is moderated by these various causes. Water in all its forms is the great moderator of heat and cold. Happily the greater part of the country is, as a rule, sufficiently well supplied with water to render extreme day and night temperatures impossible, and in many parts the climate is remarkably equable. The influence of the sea is also felt far inland all round the peninsula. In Rājputāna, Sind and Baluchistān, however, the daily range is often so great as to be extremely trying to all but the most robust. In the highlands of Baluchistān during the late summer or early autumn a day temperature of 80° F. is often followed by a night *minimum* of 10° F. The air is exceedingly dry, the ground a mixture of rock and sand, and radiation proceeds with amazing rapidity.

82. It is in this connection that the nature of the soil, and the presence or absence of vegetation, exercise a powerful influence on climate. Some soils are shallow and porous and rest upon a bed of impenetrable rock, so that the rainfall quickly flows away and they are soon dry. Such is the character of the greater part of the east and south of peninsular India.* Other soils have a remarkable power of absorbing and retaining the rain that falls upon them. The black "cotton soil" that prevails over the greater part of the north-west of the peninsula and Kāthiāwār, and the mixture of clay and loam which forms the eastern part of the Gangetic plain, are both of this nature. From such soils there is always a large amount of evaporation, even when their surface seems quite dry, and they neither heat nor cool rapidly. The sands of Sind and Rājputāna on the other hand retain no moisture. What little rain they receive soon dries up, and in the hot weather they are perfectly dry for several feet below the surface. Under the summer sun, therefore, they heat with great rapidity and to a very high degree; so much so that it is said often to be possible to cook an egg by simply laying it on the sand in the sunshine at noonday.

83. Winds almost always blow from colder to warmer regions, and are one of nature's chief ways of equalising temperature. How much India owes to *seasonal* changes of wind we shall see presently. We may notice here, however, a common *diurnal* change which greatly mitigates the summer heat along

* See Geological Outline Map on page 83.

the coasts of the peninsula. During the early part of the day the air over the land is warmed by the sun's rays far more than that over the sea. In the course of the afternoon, therefore, a cool and refreshing breeze sets in from the sea which attains its greatest strength a little before sunset and is felt for many miles inland. The hotter the day and the drier the air, the sooner does the sea-breeze begin and the stronger does it blow. A few hours after sunset it dies down, and then, if the night be clear the air over the land cools more rapidly than that over the sea, so that towards morning a land-wind is established blowing out to sea. The sea breezes which blow daily in the hottest weather greatly moderate the heat along the Coromandel coast.

84. That elevation reduces temperature is a very familiar experience in India, where cool refuges from the heat of the plains are found at a multitude of hill stations. The extent of this reduction is about 1° F. for every 270 feet of vertical ascent. The plateau of Mysore, being over 3,000 feet in height, is always from 10° to 12° F. cooler than the adjacent plains. The same cause greatly moderates the heat all over the Deccan.

85. Hills or mountain chains exercise in other ways also a powerful influence on climate. The slope of the hills turned towards the sun is always much warmer than the slope that looks away from it. Mountain chains also often intercept winds, increasing, or sometimes, though more seldom, reducing, the temperature of the protected plains as a result. The Himālayas protect the Gangetic plain from the keen and icy north winds that blow in winter across Tibet. On the other hand, during the south-west Monsoon, the Western Ghāts keep both wind and rain from the plains immediately to their east, where both would be more than welcome.

86. In the light of the foregoing paragraphs we may now illustrate the prevailing temperatures of India by a series of *isothermal charts*. In the following charts the recorded temperatures are *reduced to sea-level*, i.e., they are increased by 1° F. for every 270 feet of elevation. The approximate temperature of any place can therefore easily be found by dividing its elevation in feet by 270 and deducting that number of degrees from the temperature shown on the chart.

87. Fig. 18 shows the **Mean Annual Temperature.** It illustrates very clearly the cooling effect of the sea round

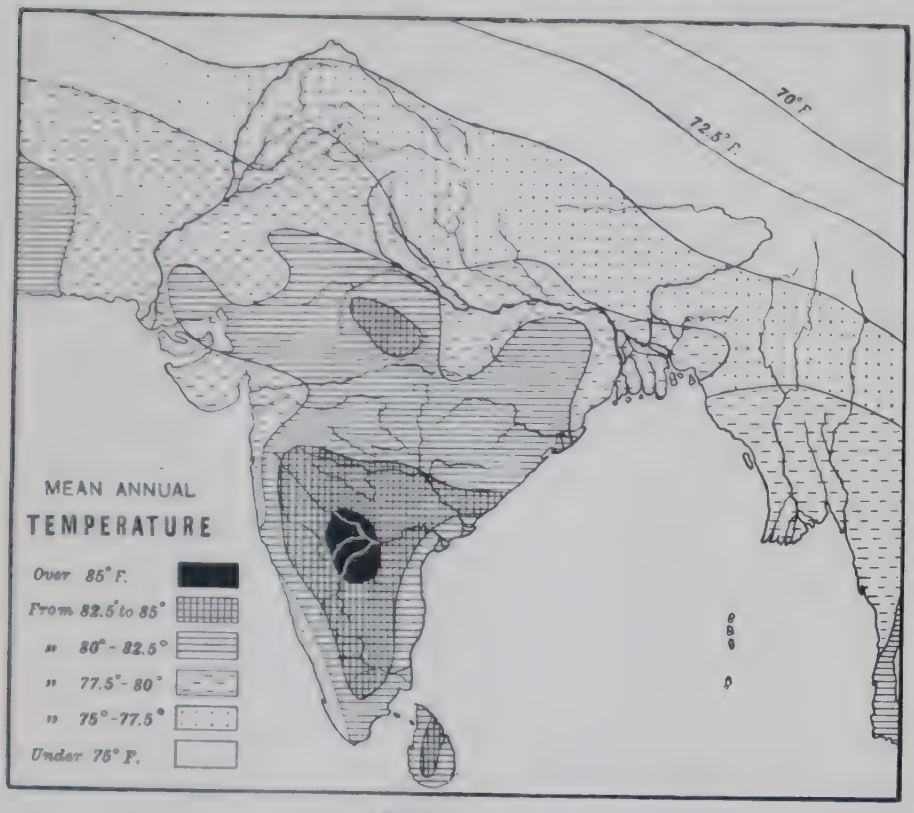


Fig. 18.

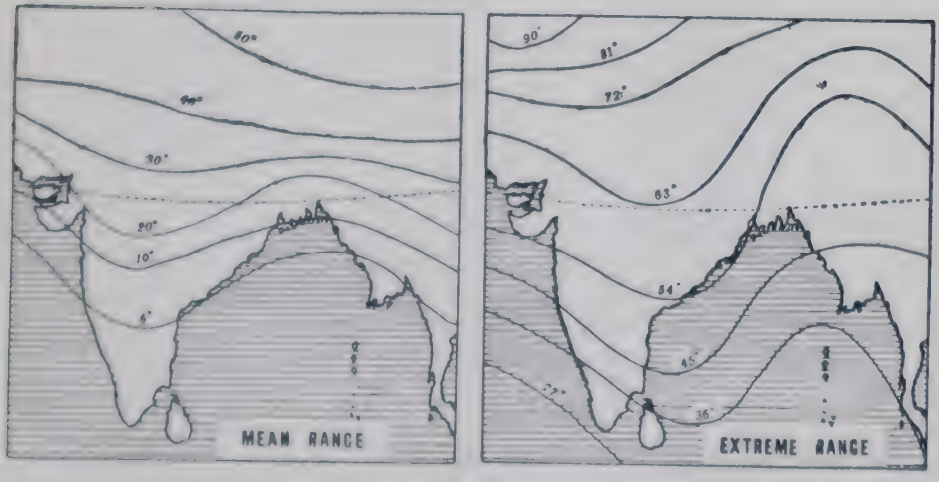


Fig. 19.

the coasts of the Indian peninsula. Fig. 19 shows (1) the **Mean Annual Range,** or the difference between the mean temperatures of the hottest and the coldest months. It will be seen that the difference is but slight in the south, but increases rapidly as we pass north. (2) The **Annual Extreme Range,** or the average difference between the highest and lowest temperatures recorded in the year. It should be noticed that the extreme range is greater on the east coast than on the west, owing to the fact that the west coast receives its chief rains in the hottest months. In June and July the south-east coast is nearly 10° hotter than the south-west.

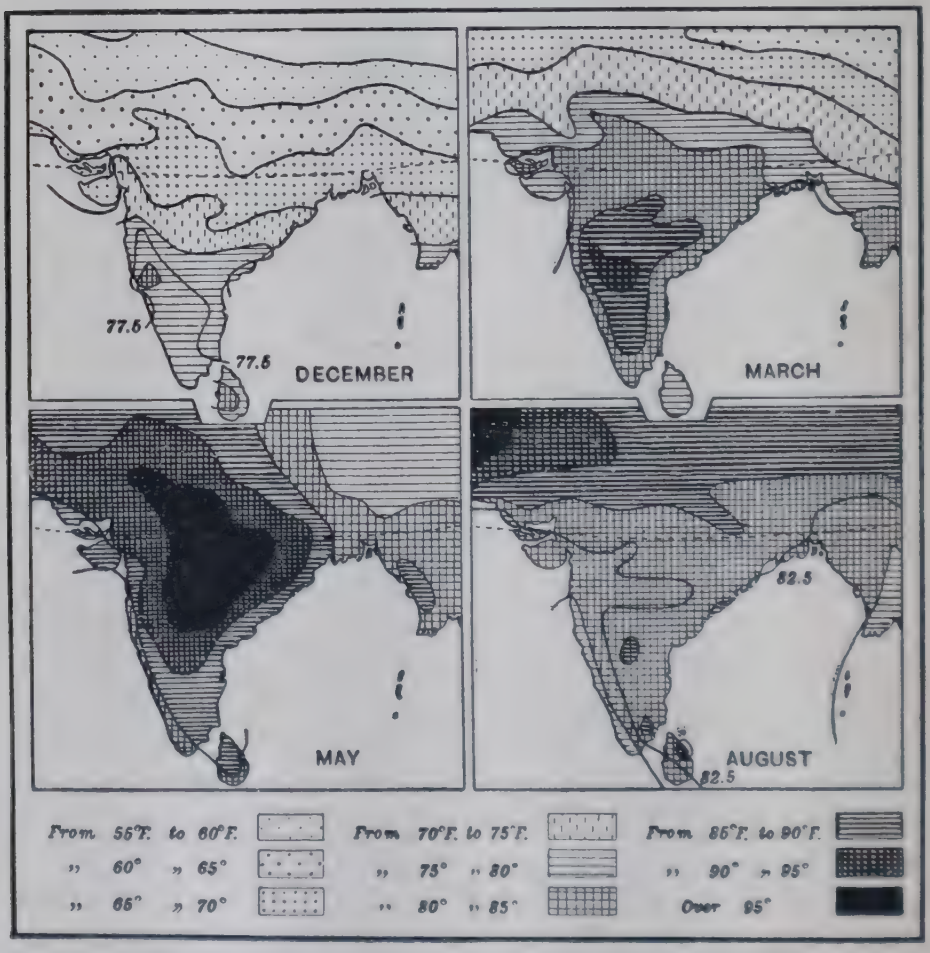


Fig. 20. Showing the temperature of India for four months.

88. Fig. 20, which gives the **mean temperatures for four months** of the year, is worthy of special study.

It will be observed that in **December,** the coolest month of the year, the hottest part of India is a small tract inland from Goa, almost half way between Cutch and Cape Comorin, where the mean temperature is over 80° F. Next come the southern and western parts of the peninsula, then the eastern as far north as a line stretching from north of Bombay to Vizagapatam. From this point the isotherms stretch irregularly from east to west across India, colder temperatures prevailing as we pass further and further north.

By **March** the sun has come north to the equator and the temperature has increased all over India, but the peninsula is still the hottest part. Along the coast the temperature is from 80° to 85° F., but a large interior tract is over 85° F., and within that is a smaller tract over 90° F.

Taking India as a whole, **May** is the hottest month of the year, the sun being well on his way to the Tropic of Cancer and the south-west monsoon as yet hardly felt. The region of greatest heat, over 95° F., is in Central India, with a large tongue stretching into Rājputāna. The surrounding area, from 90° to 95° F., keeps clear of the coast except in the north-west, and stretches into Baluchistān. The coolest parts of India are a strip along the west coast and the whole region north and east of the Bay of Bengal.

By **August** the full cooling effects of the monsoon have been felt, and it will be seen that the area of high temperature has moved away to the north-west, to a region untouched by the monsoon currents.

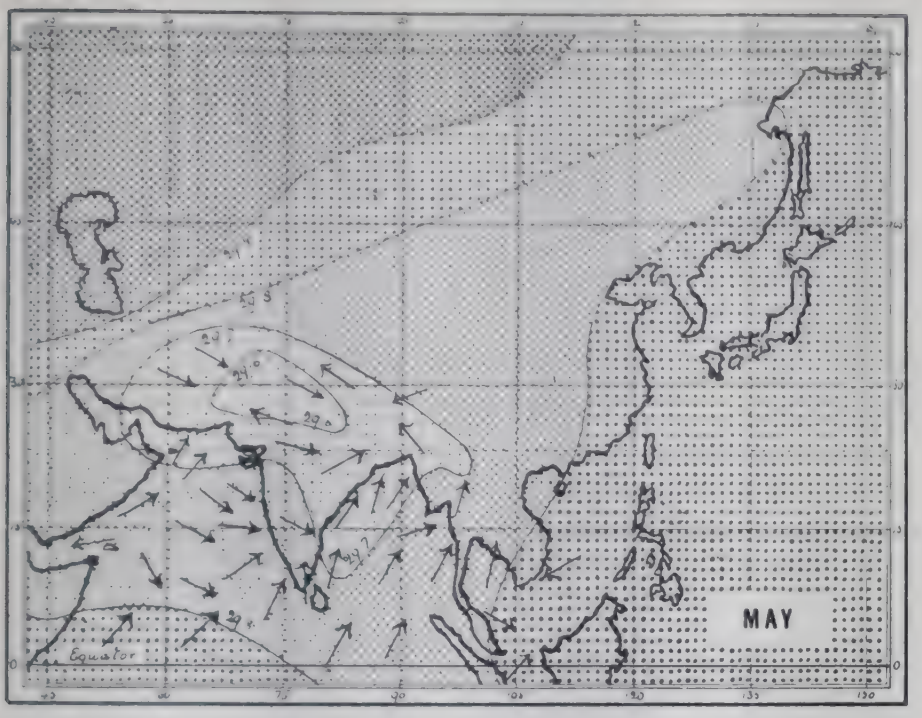
(2) The Monsoons and Rainfall

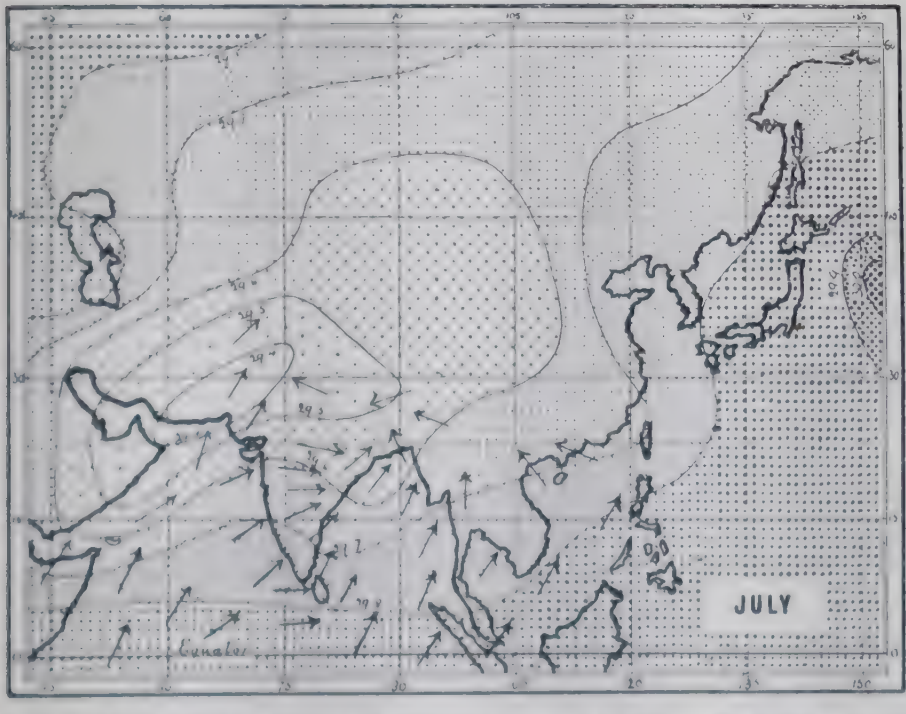
89. The **Monsoons** are the seasonal winds that prevail in India and blow alternately from the south-west and north-east, bringing the abundant rains upon which the fertility and wealth of the country depend. The **south-west monsoon,** which in ordinary years reaches the south-west coast in May and blows in full force in the northern Provinces by the end of June, is by far the most important. It is emphatically *the* monsoon. It brings to five-sixths

of peninsular and continental India and the southern slopes of their great mountain wall their main supply of water. The **north-east monsoon,** though of less moment to the country as a whole, is of great importance to the south-east of the peninsula and the north of Ceylon. These parts receive but little rain from the south-west, and the north-east monsoon makes up the deficiency.

90. The causes of the monsoons are not difficult to understand. We have seen that winds always blow from regions of higher to regions of lower pressure, and that regions of high temperature are also regions of low pressure. Winds therefore blow on the surface of the earth from colder to warmer regions. If the surface of the earth were all water, winds would blow in both hemispheres towards the equatorial belt, which would constitute a permanent zone of low pressure. By the rotation of the earth such winds would be diverted towards the west, and therefore north-east winds would prevail in the northern hemisphere and south-east winds in the southern hemisphere, and in each case these winds would be strongest when the sun was at the other side of the equator. As the southern hemisphere is mainly water, south-east winds do actually prevail over the greater part of its surface. But the northern hemisphere has more land than water, and therefore, owing to the different degrees in which land and water are heated by the sun's rays, the areas of lowest pressure are sometimes far removed from the equator, and the direction of the prevailing winds are changed. The winds in the northern hemisphere are therefore not characterised by the comparative uniformity that prevails in the south, and sometimes—as in the case of the south-west monsoon in India—the primal conditions are completely reversed.

91. By March 22nd the sun has passed the equator on his way north, and the whole of India, then everywhere fairly dry, is rapidly increasing in temperature. During that month the average pressure falls over the entire country. By the end of April an area of deeper depression has been formed over the United Provinces and Central India, and already over a considerable part of the peninsula light south-west winds have begun. These do not come from the sea, however, and so bring no water with them. By the middle of May the depression has largely increased in extent and its centre has become deeper. Its influence is consequently felt over a wider area, and as far



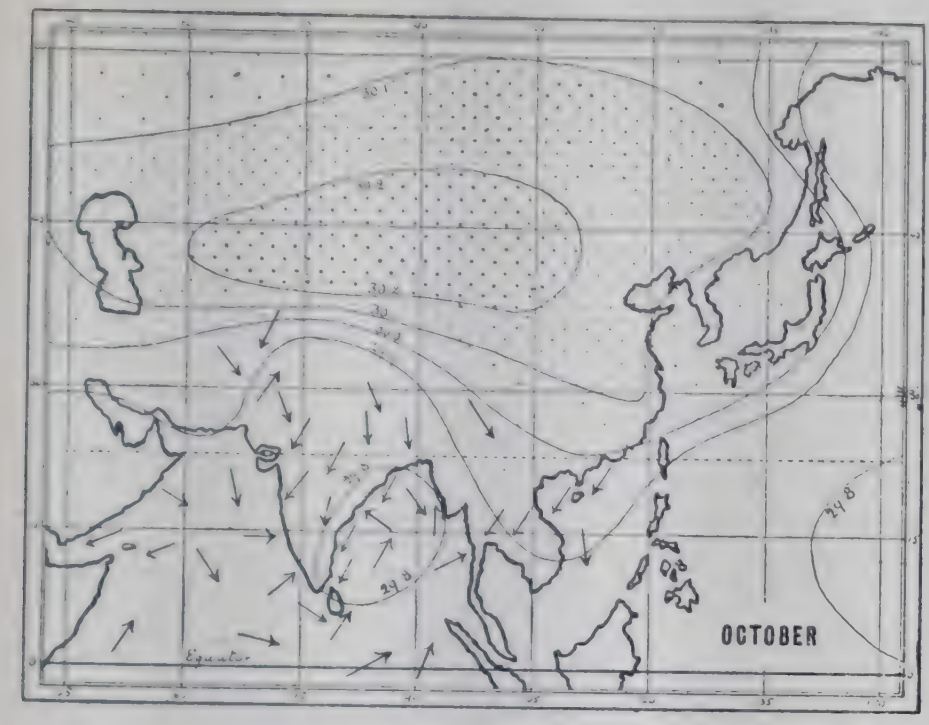


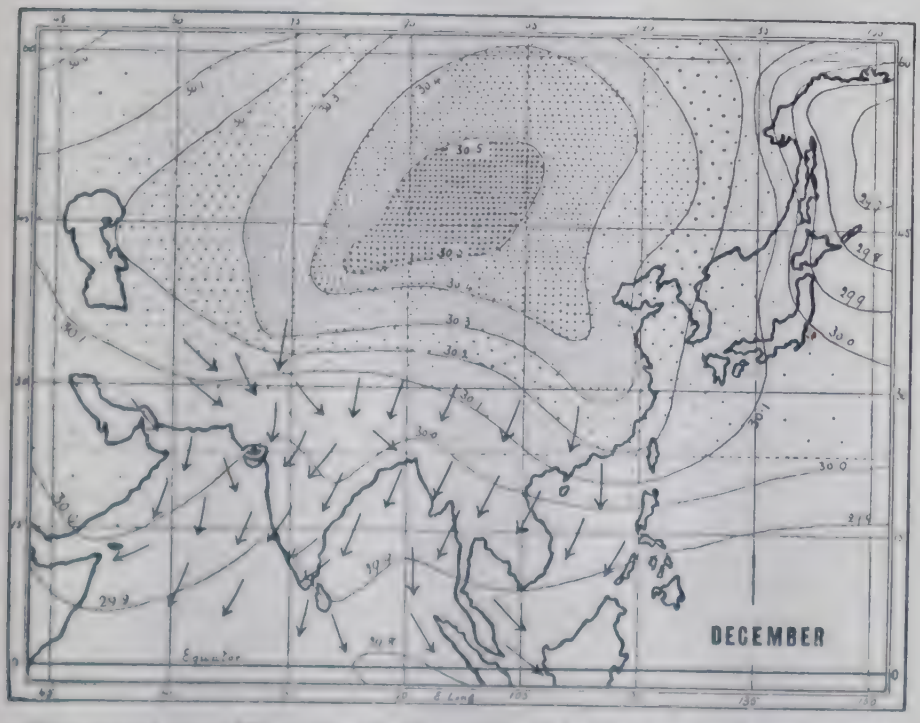
Figs. 21 & 22. Illustrating the low pressure system which causes the S.W. Monsoon

outh as the equator the winds are now mainly south-west. They strike the west coasts of India after travelling over warm oceans for many hundreds of miles, and come laden with moisture. By the end of June the depression has increased enormously in extent, and has still further deepened over northern India. The monsoon is now fully developed, and south-west winds prevail for 30° north of the equator and from the coast of Africa to the Philippines. In July the depression is still larger and its centre of greatest depth is over Baluchistān. During August and September the depression gradually diminishes and moves to the south-east.

The charts on page 55 illustrate the formation of the low pressure system and indicate the prevailing winds.

92. By September 22nd the sun has passed south of the equator, and the vast dry highlands of Asia are cooling with extraordinary rapidity. The conditions of Central Asia as to pressure are therefore soon totally reversed. By the middle of October a large system of moderately high pressure has been formed, extending from the Caspian Sea to China. What remains of the old depression, greatly reduced, is now over the Bay of Bengal. North-east winds have begun to blow in the north of the Bay, though south-west winds still prevail in the south and east. Now winds blowing from the north-east come from colder and comparatively dry latitudes. They bring little moisture with them, and though they would take up a considerable quantity from the Bay of Bengal, they could give little rain to the east coast of India, upon which they blow. For they are travelling from colder to warmer latitudes, and, growing warmer as they go, are ever increasing their water-bearing power. But south-west winds are still blowing in the south and east of the Bay of Bengal, and these coming from the warmer southern oceans are laden with moisture. Meeting the north-east winds this southerly current is bent round in the north of the Bay, and, chilled by the colder current which turns it back, it sheds its moisture in a fertilising flood on the east coast of the peninsula and far inland. It is for this cause that the north-east monsoon is sometimes called the "retreating monsoon," for its rain-giving power depends upon the south-west winds which it meets and overcomes. The rains of the north-east monsoon are, however, soon over, for by the end of November, the high pressure area having increased in intensity, north-east winds prevail over the whole Bay and the warm water-bearing





Figs. 23 and 24. Illustrating the formation of the high pressure system which causes the N.E. Monsoon.

currents are turned back long before they reach the latitude of India.

The charts on the preceding page show the formation of the high pressure system over Central Asia, and the prevailing winds for October and December.

93. Though we speak of the "South-West Monsoon" and the "North-East Monsoon," thereby indicating the general direction of the wind, it must not be supposed that the winds actually maintain these directions in every part of India. They do not. They are diverted from their original direction to some extent by local variations of pressure, and to a much greater extent by the configuration of the country. The decline in barometric pressure from

Fig. 25. Showing the direction of the winds when the S.W. and N.E. Monsoons are fully established.

west to east during the south-west monsoon (see Figs. 21 and 22) bends the south-west winds round towards the east, and they strike the coasts of Bombay as westerly winds. The opposite is the case in the north of Burma where the rapidly decreasing pressure to the north-west bends the winds round towards the north and then to the north-west. This influence is greatly intensified by the northern mountain wall, across which they cannot pass. The south-west monsoon current in the Gangetic plain blows, therefore, from the south-east, travelling from

Bengal up the plain to the Punjab and then bending north again. For similar reasons the north-east monsoon in the Gangetic plain is a north-west wind, travelling from the Punjab to Bengal, where it bends round to the south. Blowing from the north-east in the northern part of the Bay, it skirts the area of depression, bending gradually towards the south.

94. We must now follow the course of these winds and mark the conditions which determine the deposit of their life-giving store of water. The south-west winds, striking the west coast, are at once checked by the Western Ghāts. To pass these the current is forced upward to colder altitudes, and at once a large part of its vapour is condensed, and heavy and continuous rains are the result from beyond the summit of the mountains to the sea. The rainfall is great all along the western coast during the whole of the south-west monsoon, but more particularly in the south, where it commences earliest. East of the Ghāts the rainfall rapidly declines, for the current descends to warmer regions. In the month of July, when rain is falling heavily all along the Western Coast the winds reach Madras as hot and scorching blasts.

95. Towards the north the Western Ghāts decline in height, and thus present less hindrance to the monsoon current. North of the Ghāts are the long valleys of the Tāpti and the Narbadā. Up these the current sweeps, depositing a portion of its water as it goes, but reserving the bulk of it for the broken highlands of the Central Provinces and Chotā Nāgpur, where during the month of July the rainfall is very abundant. Further north again Kāthiāwār and Cutch get comparatively little, and Sind and the Indus valley very much less. The land is hot, and there are no mountains to force the current upwards, and so the winds sweep past, carrying their moisture with them till it is condensed on the slopes of the western Himālayas.

96. On the eastern side of India the south-west monsoon first gives a heavy rainfall to the south and west of Ceylon, but leaves the northern and eastern part of the

island almost untouched. Sweeping up the Bay it strikes the coasts of Burma. Tenasserim receives a very copious watering, as also does the Arakan coast west of the Yoma. Fairly heavy rains, indeed, prevail for a couple of months over almost the whole of Burma, except a central area a couple of hundred miles north and south of Mandalay, which is comparatively dry. It is a warm and sheltered region consisting of plains and low hills, and the monsoon current, having deposited much of its water in the south and west, passes over it without shedding much more of its moisture till it meets the colder mountains of the north.

97. North of the Bay of Bengal, and in the valley of Assam, the rainfall is very heavy. **Cherrapunji,** on the southern edge of the Khāsi Hills, has a fall far in excess of that of any other place in the world, receiving as a rule over 600 inches of rain in the year. This phenomenal fall, which extends only over a very small area, is due to a combination of causes. The clouds have swept up over many hundreds of miles of the warm bay and the Ganges delta, and the air is completely saturated with moisture. The slopes of the hills are sharp, and the current is swiftly diverted upwards. But this alone would not account for such a fall. Just at that point the current that is diverted toward the west by the frontier hills of Burma, meets that coming up direct from the bay, and it is probable that an upward swirl is caused that carries vast volumes of saturated air to cooler heights, ridding it thus of almost all its moisture. From the Khāsis one branch of the south-western current is diverted in a north-westerly direction along the southern slopes of the Himālayas and the great plain, and the other, turning to the east, passes up the valley of the Brahmaputra. Both these branches yield abundant rain, and the Provinces which they traverse are among the best watered tracts in India.

98. During the north-east monsoon the rainfall is chiefly on the east coast, extending inland in the south right across the peninsula to the Western Ghāts. These are the districts to which the south-west monsoon gives but little rain, blowing over them for the most part as a

comparatively dry and warm wind. The north-east monsoon makes up for this deficiency, and in the place of the summer rains which prevail elsewhere gives them a full supply in the autumn.

99. The following diagrams give the rainfall and the isobars (*i.e.*, the lines of equal barometric pressure) for four typical months.

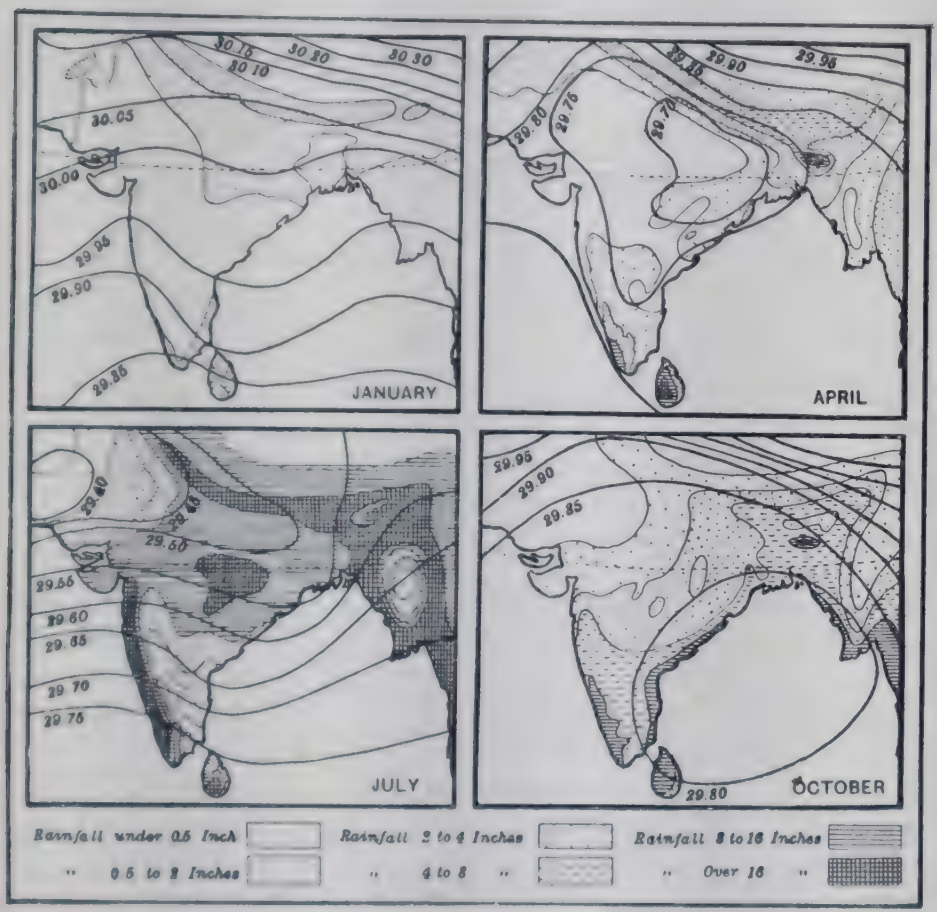


Fig. 26. Showing the isobars and average rainfall in four typical months.

January is a dry month. Over a large part of India cool, dry, north-easterly breezes are blowing but the influence of the retreating monsoon has passed away. In the north, however, along the slopes of the mountains and in the northern plains, and especially in the north-west, there is a small amount of rain

due to the influence of cold north-westerly winds that blow at this season from the highlands of Afghānistān.

In **April** the south-west monsoon currents are slowly forming, and by the end of the month Ceylon and Travancore have received the beginning of their rains. In the diagram for this month, as well as in those for July and October, notice should be taken of the comparatively dry area in central Burma.

In **July** the south-west monsoon is in full force, and it will be seen how greatly the Western Ghāts keep the rain from the districts to the east of them.

In **October** the north-east (or "retreating") monsoon is beginning. From the direct south-west currents rain is still falling on the south-west coasts of India and Burma, and the retreating current has begun to shed its store along the coast of Madras.

100. Taking the rainfall of India as a whole, we find that in most parts it is fairly abundant. The north-eastern portion of the great Indo-Gangetic plain, the whole of Bengal and Assam, the greater part of Burma, and the West Coast Districts from the Gulf of Cambay to Cape Comorin, have a very copious supply. Next to them come the eastern Districts of the Deccan Plateau. These have as a rule a heavier fall than the western Districts, where the rains are much more uncertain and variable. In the north-west of India the fall is always scanty and insufficient, and much of the land is consequently little better than desert. East of the Indus a long narrow strip is almost rainless.

101. Though the climate and rainfall of India are thus subject to well ascertained laws, and are on the whole exceedingly regular, they are nevertheless liable, particularly at the change of monsoons, to local disturbances of peculiar violence. Thunder storms are very common in many parts, and, though quickly over, they often deluge large tracts of country over which they pass. They are as a rule very welcome. They bring relief from the oppressive heat, and their rains refresh the whole face of nature. In the Bay of Bengal **Cyclones** of great severity are also frequently generated, especially at the change of monsoons. They seem, as a rule, to take their rise in the neighbourhood of the Andaman Islands, and travel at first in a westerly direction gradually changing their course to north and then north-east.

Cyclone storms are approximately circular or elliptical, and their centre is an area of deep depression. The wind blows round the centre, but bends ever inwards and upwards. Cyclones commonly strike the coast to the north of Madras, and, passing northwards, the fury of their winds often does great damage along the coast. They are usually accompanied by exceedingly heavy rains. Owing in part to the rapid decrease in barometric pressure towards the centre (which alone would account for a

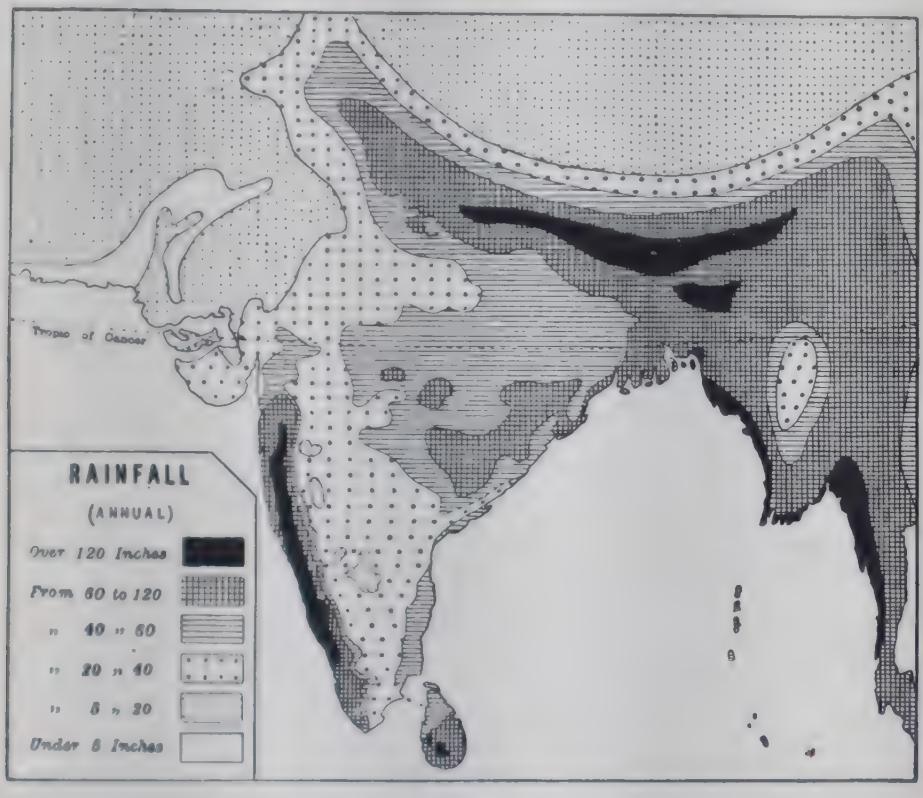


Fig. 27. Mean annual rainfall.

rise of 3 feet in the level of the water), and in part to the inward and upward motion of the wind, vast storm waves are sometimes formed, and when these strike a confined bay they sweep over the land for many miles, causing great destruction of life and property. About thirty years ago the town of Masulipatam was almost destroyed by such a wave, and a few years later a similar one swept over the Sundarbans and up the estuaries of the Ganges, doing immense damage and destroying over 100,000 lives.

CHAPTER III

THE PEOPLE OF INDIA

(1) Ethnology

102. The ethnology of India is still in its infancy, and only its bare outlines can be regarded as in any degree settled. In some respects it is less settled now than it appeared to be a few years ago. By modern ethnologists more reliance is placed on the study of physical types than on that of language, and many conclusions that were believed, on linguistic evidence, to be firmly established are now widely rejected. Twenty years ago language was regarded as yielding by far the most valuable testimony as to the origins of races and tribes and their pre-historic movements. At the present time a minute study of physical type is more relied on, and in this direction a large amount of most valuable material has been gathered by the **Ethnographic Survey of India,** commenced in Bengal twenty years ago and now proceeding in most of the Provinces. The results of this survey up to 1901 were carefully worked out in the General Report on the Census of that year, Chapter XI. But before summarising these results, it will be well to glance briefly at the theories commonly accepted till within the last ten years. In the main these are supported by recent investigations, but in some important points they must now be greatly modified.

103. The vast majority of the people of India have long been known to belong to two great stocks, the **Aryan** and the **Dravidian.** To what extent these two stocks have mingled, where the purest blood of each is now to be found, and over what extent of the country each now predominates —these are questions on which a variety of opinions have been held, and to which a study of type alone can give a decisive answer.

104. In addition to these great stocks, three others of subordinate importance to India have been distinguished. The **Tibeto-Burman,** which has influenced the country on the east; the **Scythian,** of Mongolo-Tartar origin on the west; and the **Kolarian,** of doubtful origin, but closely related to the Dravidian, and represented in modern days by scattered tribes east and west of Central India.

105. That the Aryans entered India from the north-west, pressing on in successive swarms probably through many centuries, has long been universally agreed. Language, custom, and tradition alike bear testimony to this. Whether the Dravidians and Kolarians had similarly an external origin, and entered India in invading swarms long anterior to the inroads of the Aryans, or whether they should rather be regarded as the true aborigines of the country, has been a disputed point. As regards the Dravidians, the former conclusion has been the one most favoured. There exists in Baluchistān a "linguistic island" of Dravidian speech, the **Brāhūī** language, cut off from the main body of Dravidian tongues by nearly 1,000 miles. This has been taken as strong proof that the Dravidians, like the Aryans after them, came from the north-west. Sir W. W. Hunter accepted this, and further held that the Kolarians came into India from the east, and, stretching across the north of the peninsula, peopled the highlands from Orissa to the mouth of the Narbadā before the influx of the Dravidians; and that the latter, when pressed by the Aryans in the north, broke through the Kolarian line and forced their way into the south of the peninsula. The Dravidians had thus driven "an ethnic wedge" down the centre of the peninsula, dividing the Kolarians into two sections. He thus accounted for the separation of the **Bhīls, Kolas,** etc., of the west from the **Santhals, Kols,** etc., of the east—all of which tribes he believed to be Kolarian.

106. To these four stocks a fifth was added almost in historic times. The **Scythians** appear to have come from Central Asia, and to have forced their way across the north-west frontier. Their influence is to be traced throughout

the whole of west India, but Hunter believed that this race had permanently occupied the plains of the Indus, and that the noble race of **Rājputs,** and the **Jāts,** the most important agricultural tribe of western Punjab, are their modern representatives.

107. Such were the conclusions drawn mainly from a study of language, with whatever additional light was to be had from a comparison of social systems, from tradition, and from a general agreement of type. Modern ethnologists, however, hold that physical type is far more persistent and unchanging than language, and that, when we can decipher it, we shall find the ethnic history of every people more truly recorded in their physical characteristics—shape of head, style of features, stature, hair, eyes, etc.—than in their speech. They further hold that a minute study of physical type is likely to prove of peculiar value in India, where for centuries tribes and castes have lived apart, with but little intermixture of blood; for in such a case types may be expected to persist with unusual definiteness.

108. It is exceedingly probable that this line of investigation may yield most valuable results in India within the next few years. In the Census Report Mr. H. H. Risley, C.I.E., summarises the results of the Survey as far as it had then proceeded, and on the basis of the data collected divides the people of India into the following seven distinct types :—

I. The **Turko-Irānian** type, in Baluchistān and the North-west Frontier Province. *Stature above mean; complexion fair; eyes mostly dark, but occasionally grey; hair on face plentiful; head broad; nose moderately narrow, prominent, and very long.*

II. The **Indo-Aryan** type, in Punjab, Rājputāna and Kashmīr. *Stature mostly tall; complexion fair; eyes dark; hair on face plentiful; head long; nose narrow and prominent, but not specially long.*

III. The **Scytho-Dravidian** type of Western India. *Head broad; complexion fair; hair on face rather scanty; stature medium; nose moderately fine and not conspicuously long.*

IV. The **Aryo-Dravidian** type in the United Provinces, parts of Rājputāna, in Bihār, and Ceylon. *Head long or medium;*

complexion from light brown to black; nose from medium to broad; stature usually below the average.

V. The **Mongolo-Dravidian** type of lower Bengal and Orissa. *Head broad; complexion dark; hair on face usually plentiful; stature medium; nose medium, with a tendency to broad.*

VI. The **Mongoloid** type of the Himālayas, Assam, Nepāl, and Burma. *Head broad; complexion dark, with a yellowish tinge; hair on face scanty; stature below average; nose fine to broad; face characteristically flat; eyelids often oblique.*

VII. The **Dravidian** type of Madras, Hyderābād, the Central Provinces, most of Central India and Chōta Nāgpur. *Stature short, or below mean; complexion very dark, approaching black; hair plentiful, with an occasional tendency to curl; eyes dark; head long; nose very broad.*

109. It will be seen that the **Aryan** element is much less prominent than has hitherto been thought, and on the other hand, that the **Dravidian** element is more widespread. The purest Aryan type is found under Type IV. among the **Rājputs, Khattrīs,** and **Jāts,** and the theory that would assign a Scythic origin to these races may be regarded as finally disposed of. They have apparently maintained very largely the purity of their blood, while the Indo-Aryans of the United Provinces have commingled with the Dravidians. In explanation of this Mr. Risley surmises that they came into India by slow and peaceful migration, bringing their women with them, while the ancestors of their western neighbours, coming into India at a later date and by a more toilsome and hazardous route, brought few, if any, women with them, and took wives of the daughters of the land. With regard to the Dravidians, Mr. Risley's conclusion is that they are the earliest inhabitants of India of whom we have any knowledge.

110. The map will show the localities in which these several types prevail. It must be remembered, however, that each type gradually shades off into the neighbouring one, and that the boundaries are therefore only approximate. The divisions, moreover, only indicate the general type of the *bulk* of the people. The proportions in which the racial elements combine in different classes of the

community are also very various. Among the Scytho-Dravidians the Scythic element predominates in the Marāthā Brāhmans, and the Aryan element predominates among the Brāhmans of the Aryo-Dravidians. There is also a certain admixture of the Aryan element almost

Fig. 28. Showing Race Distribution.

everywhere among the higher castes, and traces of Scythic and Mongolian blood are found among the Dravidians of the south.

(2) Distribution of the Population

111. India is essentially an agricultural country. According to the last Census nearly 200 millions of the people were engaged directly in agricultural or pastoral occupations. These people are necessarily scattered over

the land and not congregated together in towns. Many more are *indirectly* employed on the land, being engaged in ministering to the needs of the agriculturists proper. These also are scattered over the country. India has no great mineral resources, and even what she has are as yet but little worked. Nor are there any great manufactures to draw the people together in towns. Small manufactures there are in plenty, and some have their centres in particular localities. But in no sense can India, or any Province of India, be called a *manufacturing country*. The result of this is that the vast majority of the people live in hamlets or villages, and the towns and cities are comparatively few, and for the most part small. This is best seen by comparing India with a great manufacturing country like England. While in India, out of a population of 294 millions, only 27¼ millions—or considerably less than 10 per cent.—live in towns of 5,000 inhabitants and over, in England 77 per cent. of the total population live in such towns. In the one case over 90 per cent. of the people are scattered over the land, but in the other only 23 per cent. India is thus emphatically a land of villages.

112. In ancient days these villages were generally *self-contained and self-organised communities*. They had but little communication with the outside world and needed little. Living upon the soil, the majority of their people were cultivators, but the simple handicrafts, etc., necessary for the independent life of an agricultural community were represented in every village, and all occupations passed from father to son. In ordinary years, when nature was propitious, such villagers had few inducements to look beyond their own narrow borders. Roads were few; travelling difficult and dangerous; and, except when some religious festival drew them to some famous shrine, they spent their quiet and laborious days among their own people. In many parts of India this is still to a large extent the case, but in others it is rapidly passing away. Better roads, and other means of communication, the spread—even among the illiterate—of some knowledge of the world beyond, the increase of their means, and the opening of outside markets for their produce, are all enlarging the outlook of the people, breaking down their village exclusiveness, and bringing them into touch

with a wider world. But these influences do not tend to substitute town life for village life, nor will they ever do so. So long as India remains, as she must remain, an agricultural country, the vast majority of her people must live upon the land they till.

113. In modern days the growth of towns on particular sites is almost always due to one or more of three reasons. A site may present (1) special natural advantages for some particular manufacture, as when the presence of rich iron ore and coal leads to the development of a great iron industry, giving employment to thousands of people. Or it may offer (2) peculiar facilities for commerce, where the produce of different lands, or districts, may be most easily brought together for exchange. Such sites are natural harbours, the mouths of navigable rivers, the junctions of inland trade routes, etc., where commercial towns tend to spring up. Or it may be (3) that a site presents such natural attractiveness, combined with a healthy and invigorating climate, that its suitability as a sanatorium and holiday resort is recognised, and a considerable settlement springs up. This last is an essentially modern cause of towns, and is due to the increase in the facilities of travel, and of the wealth and leisure of the people. It is naturally, therefore, most operative in Europe and America, where a multitude of towns trace their growth and prosperity to no other cause. But it has also been operative in India, and such hill stations as **Simla, Darjeeling, Ootacamund,** etc., owe their existence to it alone. Such towns are, however, of less importance than those whose origin is to be ascribed to the other causes named. Though they may grow to considerable size and wealth, and may be, as in India, summer seats of Government, they exercise no great influence on the development and destiny of a people.

114. But while in these modern days most towns are indebted to commerce or manufacture for their prosperity, very different reasons may have led originally to their foundation. In ancient times (1) political and (2) religious considerations had more to do with the founding of towns

in India than had commerce. At various periods the country has been overrun by foreign invaders, and at others has been broken up into a multitude of States almost ceaselessly at war with one another. In such times, wherever a powerful chief settled, people flocked to him, partly for defence and partly for trade; and a town soon grew up, which became his capital and the seat of his government. The site of such a town was chosen not so much for commercial as for military reasons. It had, indeed, to be situated, if possible, in some place to which the supplies needed by his retainers and army could be easily brought; but it was still more needful that it should be in a good strategic position, well adapted both for defence and as a base for attack. A large number of Indian towns had this origin. Many others owed their origin to religion. The presence of a famous shrine, or the proximity of a sacred river, attracted annually multitudes of pilgrims, whose requirements in the way of accommodation and provisions afforded lucrative employment for a large resident population.

115. When once a town has been founded, no matter what its origin may have been, *it tends to build up for itself a trade* and thus to maintain itself in prosperity, even though the circumstances in which it had its rise should quite pass away. Religious change in India is so exceedingly slow, that towns which grew up at first for the convenience of pilgrims are often preserved in prosperity for many centuries by the conditions which gave them birth. We have illustrations of this in **Benares** and **Puri.** Purī exists solely for the sake of pilgrims, and though Benāres has now an additional importance, due to other and modern causes, yet its shrines and pilgrims are still the chief sources of its fame and wealth.

116. Political changes in India have, however, been as rapid as religious changes have been slow, but British rule has now given peace to the whole country. Many towns, therefore, that had a *strategical* origin are now flourishing *trade centres*. In most cases they possessed from the first, as we have seen, a certain suitability of position for trading

purposes. When they became centres of Government, and seats of a large population, roads were pushed out in every direction, and other means of communication opened up, till in course of time they became the recognised emporia for large districts. When their political importance declined, their trade still maintained them and became a more enduring cause of prosperity and wealth. Under British rule such towns have frequently become centres of civil or military administration, and have regained much of their old greatness. **Delhi, Lucknow, Allahābād, Poona,** and a host of others are examples. When, however, such ancient military towns were not well situated for trade, and did not become the natural and accepted commercial centres of considerable districts, any change in the political circumstances which gave them birth generally led to their decline, and sometimes to their complete extinction. **Kanauj, Ajodhya, and Seringapatam** are illustrations of this.

117. Of the ancient towns in India which owe their origin to commerce, comparatively few are of any size or great importance. India has always had a considerable foreign trade, and though even in ancient times the bulk of it was, no doubt, carried by sea, it gave rise to no sea-port of any magnitude that has survived to modern days. This was mainly due to the fact that the trade was carried in foreign ships, and the people of India themselves never took largely to navigation. Further, the trade being chiefly on the West Coast, where the accumulation of sand washed up by the sea is greatest, such ancient ports as there were have either been obliterated or have become inland towns. Even the later ports of **Surat, Cambay,** and **Goa,** which enjoyed the earlier trade round the Cape of Good Hope, have greatly suffered from this cause, and the bulk of their trade has now passed to Bombay. Overland commerce has, however, left more permanent marks on many of the towns of the north and north-west. **Shikārpur** has for ages controlled the trade across the Bolān Pass; **Dera Ismail Khān,** and, further inland, **Shahpur** and **Mūltān,** that by the Gomal; **Peshāwar,** that by the

Khaibar; and Jullundur and Amritsar, that through Kashmīr to Tibet. All these towns owe much to the fact that for centuries they have been the natural and recognised centres for the trade carried on across these ancient mountain routes. Inland trading towns grew up in early times, chiefly along the great water-ways of the Ganges and Indus, or where trade routes crossed one another.

(3) The Density of Population

118. In an agricultural country like India, which does not import its food but grows it, the population of every considerable area tends to increase till it approaches the maximum that the produce of the land can feed. But the abundance of the harvests depends upon the nature of the soil and the sufficiency and regularity of the water supply. And, since in most places the water supply is almost entirely due to the rainfall, it follows that, as a general rule and within certain limits, the density of the population varies with the average rainfall. Of course, there are many exceptions to this. The rainfall may be so irregular that, though the country may have a large *annual average*, it may, nevertheless, be burnt up for the greater part of the year and flooded for a few weeks. Such an irregular rainfall as this would not greatly promote agriculture. Or, though the rainfall is large and regular, the land itself may consist of rocky and barren hills. Both the produce and the population will then be low. On the other hand, a country which has a scanty rainfall may be well watered by irrigation, and therefore fertile. But if sufficiently large areas be taken, it will be found that regions of ampler rainfall are also regions of denser population.

119. It should be noted, however, that this connection *only holds good in agricultural countries*. Wherever other industries are largely developed, whether mining or manufacture, a population is often found far larger than any that the land itself could support. The wealth made by these industries enables such countries to import much of their food from other lands.

120. The following map, which shows the density of the population in the several States and Provinces of the Empire, illustrates in part this relation between rainfall and population. If it be compared with the rainfall map on p. 63 it will be seen that the densest population

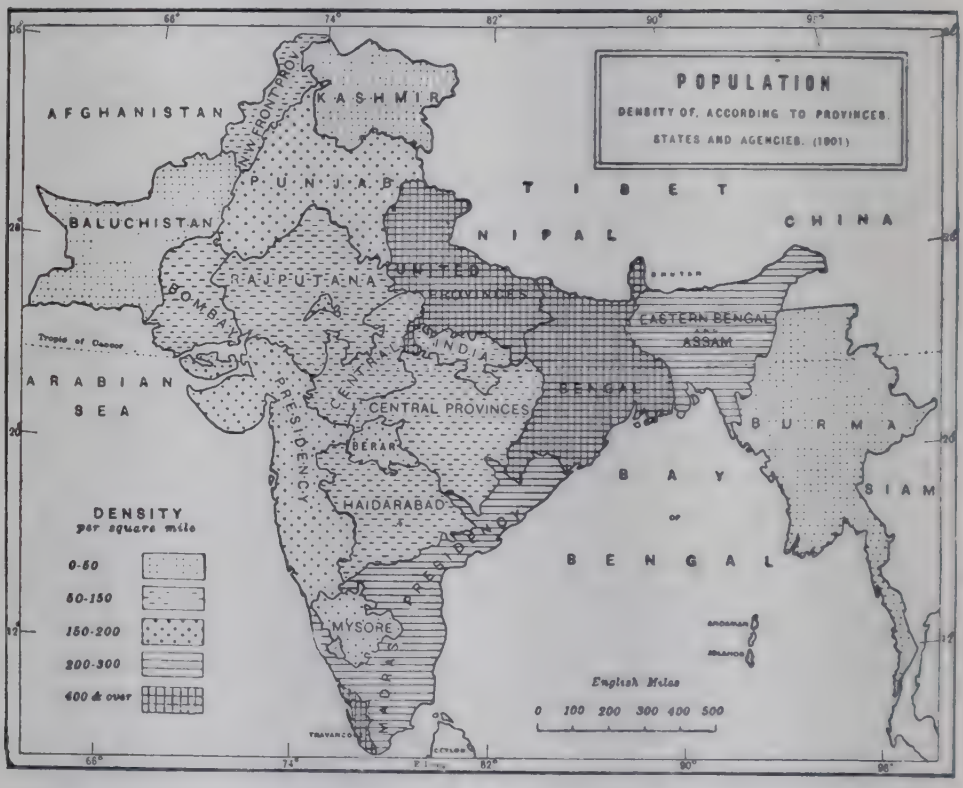


Fig. 29.

is found in the well-watered Provinces of the Gangetic valley and the south-west coast. Next come the east and west coast districts, where also the rainfall is fairly reliable and abundant.

(4) Language

121. The two great families of languages that divide between them almost the whole of India proper are the **Aryan** and the **Dravidian.** Indo-Chinese languages prevail in Burma and along the Himālayas.

At one time Dravidian forms of speech probably occupied the whole country. That is at least suggested by the fact that scattered tribes, speaking Dravidian tongues, are still found as far north as Baluchistān in the west and Chotā Nāgpur in the east. Now, however, the vernacular languages of at least four-fifths of the Indian people belong to the Aryan family. A comparison of the language map on page 78 with the map showing race distribution on page 68 will show that Dravidian blood is far more prevalent in India to-day than Dravidian speech. This is precisely what might have been expected. Whenever a stronger people, more advanced in all the arts of life, and with a more developed language, dispossess a weaker race, the latter will in course of time adopt the language of their conquerors, even though, through intermarriage, the races themselves may coalesce. The superseded tongue may contribute any number of words to the new language which the conquered must adopt, but ultimately the language which survives will be, in idiom, form and structure, the language of the conquerors. This process has gone on largely in India. Though Dravidian blood still prevails in some degree almost up to the Himālayas, and in comparative purity as far north as Central India, Dravidian languages are, with the exception of a few scattered remnants, confined to those parts of South India over which the waves of Aryan immigration never swept in force.

122. The principal **Dravidian** languages are **Telugu, Tamil, Kanarese,** and **Malayālam,** which are spoken respectively by about 20½, 16½, 10½, and 6 millions of people, inhabiting an area which forms a solid linguistic block in south-east India. **Gond** is spoken by over a million people, chiefly in the Central Provinces; **Tulu** by over half a million in South Kanara; **Kurukh,** or **Orāon,** by about the same number on the hills of Chotā Nāgpur, and **Kandh** by nearly as many on the hills of Orissa. There are many other Dravidian languages spoken by smaller numbers, the most interesting of which is **Brāhūī,** spoken by an isolated group in eastern Baluchistān.

Santālī and **Kol,** the languages of the Santhāls and Kols, who number nearly three millions and are found in Bihār, Chotā Nāgpur and Orissa, are the chief languages of the **Mundā Sub-Family.** There are several other members of this group, but less known, and spoken by smaller numbers. These languages used to be called **Kolarian,** and the Kolarians were believed by some to have entered India from the north-east. The group is, however, essentially Dravidian, and is probably identical in origin with the Dravidian languages of the South.

123. The **Aryan** languages spoken in India fall into two classes, the **Irano-Aryan,** or **Irānian,** which prevail west of the Indus, and of which **Baloch, Pashto,** and **Persian** are the chief examples, and the **Indo-Aryan** which prevail from the Indus to the confines of Burma, and southwards till they meet the Dravidian languages of the peninsula

124. All the chief **Indo-Aryan** languages are Sanscritic in their character, Sanscrit, the great classical language of India, having in all probability been developed into the form in which it is found in the Vedas long after the final Aryan immigrants had settled in the "Middle Land." A comparison of these languages suggests that they were introduced into India at two different periods, probably separated by several centuries; that the earliest wave of immigrants, coming, most likely, from the west, spread over the greater part of western and northern India before the arrival of the second wave; and that these latter, coming most probably across the northern frontier, forced their way into the middle of the previous settlers, and, as they grew in numbers, drove them gradually to the east, south and west, and to some extent also to the north. Dr. Grierson, the head of the *Linguistic Survey of India,* calls the languages whose origin is to be traced to these later settlers, the **Inner Indo-Aryan** languages, and those that appear to have sprung from the language of the earlier settlers, the **Outer Indo-Aryan** languages. To the east of the Inner group there is also a smaller **Intermediate** class formed probably by a fusion of the two. The chief

languages belonging to each group, with the approximate number of people speaking them, are as follows :—

INNER INDO-ARYAN.	
Western Hindī	39,367,000
Rājasthānī	10,917,000
Gujarātī	9,928,000
Punjābī	17,070,000
Pahārī	3,124,000
INTERMEDIATE INDO-ARYAN.	
Eastern Hindī	20,986,000
OUTER INDO-ARYAN.	
Kashmīrī	1,007,000
Lahndā	3,337,000
Sindhī	3,006,000
Marāthī	18,237,000
Oriyā	9,687,000
Bihārī	37,076,000
Bengali	44,624,000
Assamese	1,350,000

125. The localities in which these various languages are spoken are shown on the map on the following page. It should be remembered, however, that neighbouring languages shade off into one another by almost imperceptible gradations, and though the boundaries are of necessity sharply defined on a map, they are not so in reality.

126. Most of these languages have numerous dialects, sometimes exhibiting a very wide degree of divergence. The only one of these that we need notice is **Hindustānī**, the chief dialect of Western Hindī. Hindustānī is spoken more or less all over India, and particularly by the Muhammadans, and is often spoken of as the *lingua franca* of India. **Urdū** is *literary* Hindustānī, written in the Persian character, and often greatly modified by the introduction of Persian words. The prevalence of Hindustānī throughout India is due to the widespread influence of the Mughal Empire, and to the fact that Muhammadans are numerous in every Province.

127. In the extreme north of India are tribes speaking **Non-Sanscritic Indo-Aryan** languages. They are few in

number, however, and none of their dialects have native characters.

128. The **Indo-Chinese** languages spoken in India, of which by far the most important group is the **Tibeto-**

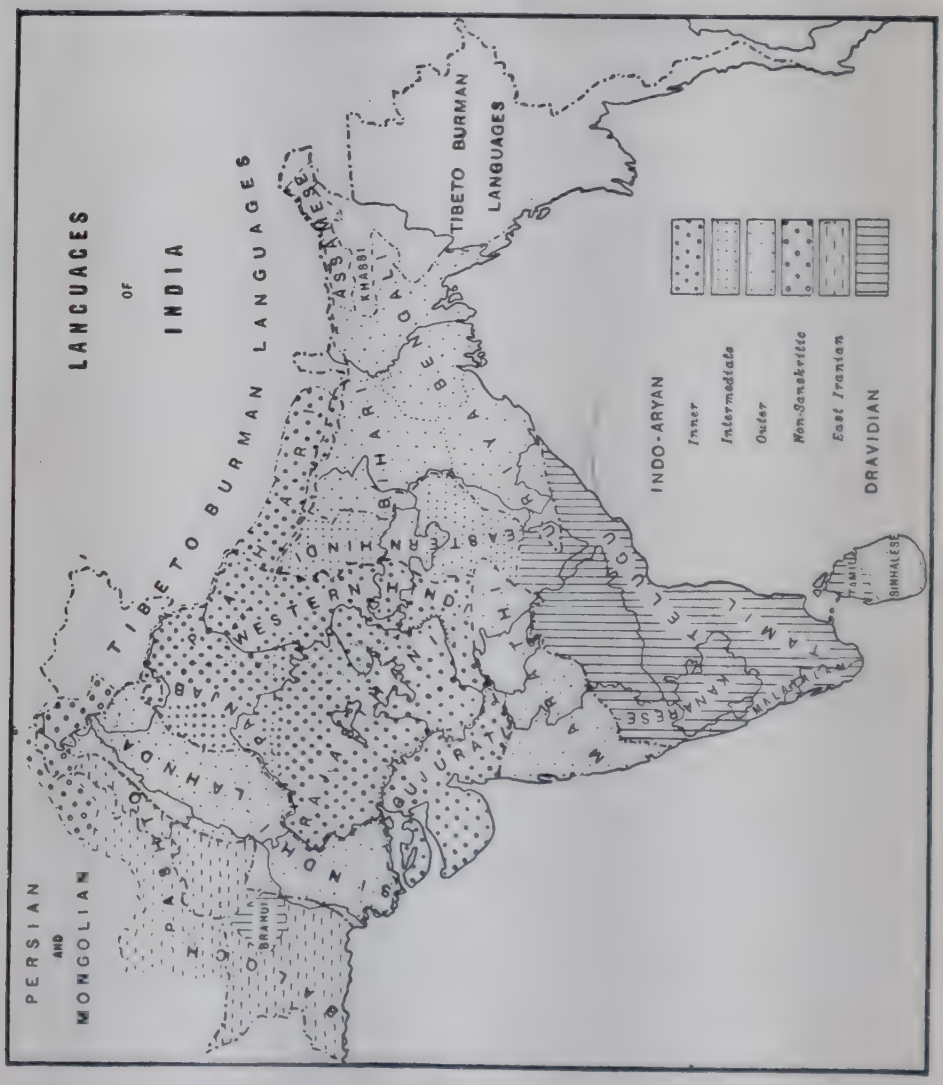


Fig. 30.

Burman, are very numerous, including no fewer than 92 of the 147 languages enumerated in the Census Report. They are spoken, however, by a comparatively small fraction of the people, less than twelve millions in all,

including the people of Burma and the border mountains, the Khāsi and Gāro Hills, and the slopes of the Himālayas. **Burmese,** the most cultivated of these languages, is spoken by about 7½ millions. **Karen** and **Shan,** spoken by tribes bearing the same names, are closely related to Chinese, and are each spoken by about a million people. The rest of the languages of this group are spoken by mere handfuls of people. Comparatively little is known as yet about many of the Indo-Chinese languages.

(5) Religion

129. Of the 294 millions of people in India in 1901, 207 millions were classed as **Hindus.** But the term **Hinduism,** as now used, includes such a wide variety of beliefs and customs that definition becomes impossible. The early Dravidians were **Animists,** *i.e.*, believers in spirits, mostly malign, that had constantly to be propitiated by sacrifice and offering. The non-Caste population of south India are little more than this to-day. The Aryans, on the other hand, early developed a philosophic cult, chiefly pantheistic in character, which was overgrown in later ages by a vast mass of Brāhmanical ceremonial and custom. The Aryans in India greatly influenced the earlier races with which they came in contact, imposing their authority and imparting their religious rites, but at the same time adopting and sanctioning many elements of their primitive animistic beliefs. Every type of religion in which a Hindu element is discoverable in any degree is now classed as Hinduism, and that term therefore covers every variety of belief and ceremonial custom, from almost the crudest animism to philosophic pantheism. Between the various *sects* of Hinduism, or between the multitudinous *castes*, there are to-day hardly any common bonds save reverence for Brāhmans, the observance of caste rules, and belief in the sacredness of the cow. Only a few primitive tribes inhabiting hilly tracts in the peninsula are now classed as Animists. Their number, which is decreasing, is about 8½ millions.

130. **Muhammadanism** has more than 62 millions of adherents in India. They form the majority of the population in the Punjab, the North-West Frontier Province, Bengal, and Assam, as well as in the State of Kashmīr, and are numerous all over India. Muhammadanism was introduced into India in comparatively recent times by the incursions of the Afghāns, the Mughals, and others, and its prevalence throughout India is to be traced mainly to the influence of the Mughal supremacy. Its doctrines, based on the *Quran*, make Muhammadanism an essentially aggressive faith. Over India, as over many other lands, it was spread chiefly through the influence of civil and military power. It is still aggressive in many parts of India, though its growth now is mainly due to social influences.

131. **Buddhism** was in its origin a revolt against Brāhmanism, and was founded by GAUTAMA, who was born about five and a half centuries before the Christian era. Though it flourished greatly in India for several centuries, Benares itself being for long a Buddhist city, it has not taken permanent root in the land of its birth. It has spread, however, over the greater part of eastern Asia, and now numbers over 100 million votaries. At the date of the last Census there were nearly 9½ million Buddhists in the Indian Empire, but they were almost entirely confined to Burma.

132. **Jainism** arose about the same time as Buddhism, or perhaps a little earlier, and has much in common with it. It does not, however, make *nirvana* the great goal of aspiration, but believes that the soul, when delivered from the bondage of matter, will enjoy a separate and conscious spiritual life. The modern Jains number about 1,300,000, and are found chiefly in Rājputāna, Bombay and Central India. They observe caste, have an inordinate number of temples, and are remarkable for their reverence for every form of animal life.

133. **Sikhism** is of much more modern origin. Its founder, BABA NANAK, was a vigorous preacher born near Lahore a little more than 400 years ago. His followers formed a religious society, which his successors in power

bound together by strict political organisation and military discipline. In the history of India the Sikhs have been rather a military than a religious force. As a religion Sikhism acknowledges one God, inculcates reverence for its sacred writings, or *Granth*, and rejects all caste distinctions and ceremonies. The Sikhs number now about $2\frac{1}{4}$ millions, and have their headquarters at Amritsar in the Panjab.

134. **Christianity,** in one form or another, has existed in India for many centuries, chiefly on the south-west coast, where the **Syrian Christians** have long been settled. Both Roman and Protestant Christianity have increased rapidly in India of recent years, and the number of Christians returned at the last Census was nearly 3 millions.

135. Among the minor religious bodies found in India are the **Parsees** and the **Jews.** The **Parsees** are fire-worshippers, whose ancestors came from Persia. Their sacred book is the *Zend-avesta* of ZOROASTER. They are settled chiefly in Bombay, where they constitute a thriving commercial community numbering about 95,000. There are over 18,000 **Jews** in India, two-thirds of whom are in Bombay and along the west coast. How or when they came is a disputed point, but in some places they enjoy very ancient rights. As in all other countries the Jews in India keep themselves rigidly separate from the people among whom they dwell.

CHAPTER IV

NATURAL PRODUCTIONS

136. As a necessary preliminary to any useful study of the natural products of India, and especially of the cultivated vegetable products, we must first consider the nature of the soil and the supply of water for agricultural purposes. We have glanced at both these subjects in other connections, but they claim now a more detailed and careful examination if we would understand the *natural distribution* of vegetable products, and the reasons why different crops, or different methods of cultivation, prevail in different districts.

(1) The Soil

137. The soil is the weathered product of the rocks of which the earth's crust is composed. Whenever rocks, however hard, are exposed to the influence of air and water, heat and cold, they slowly crumble. This process, which is partly chemical and partly mechanical, is termed "weathering." It is accelerated by the presence of vegetation, for not only do plants promote chemical action, but their roots, penetrating into the minutest crevices, soon split the hardest rocks. The soil is the product of long ages of such weathering, increased and enriched by the decay of plants and animals.

138. Whatever other substances may have mingled with it and modified it, it is plain that the character of the soil must everywhere depend primarily upon the character of the rock from which it is derived. In a great alluvial plain like that of the Ganges the soil is a mixture of the crumblings of many kinds of rock which the rivers have brought from great distances, and which have been ground down by attrition to a fine impalpable mud. But in other

cases there may be little mixture, and especially is this the case where particular geological formations cover large areas, when the difference between different soils is almost as marked as the difference between the rocks from which they are derived. Nowhere is this more clearly seen than in the Deccan, where the soil that prevails in the north-west offers a striking contrast to that of the east and south.

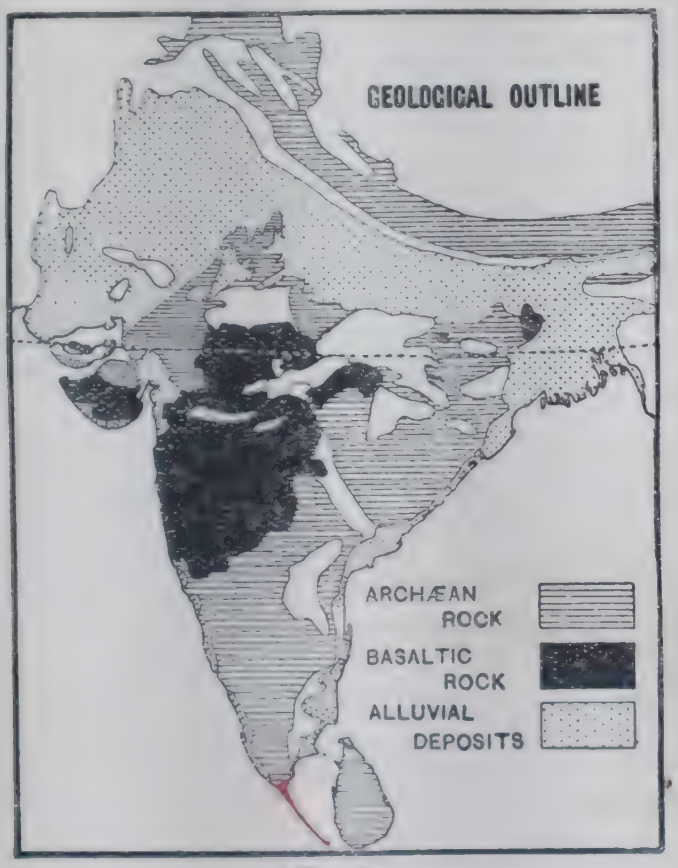


Fig. 31.

139. We have seen that the Arāvallis and the Eastern Ghāts are the most ancient hills in India. The geological formation of which they are in the main composed extends right across the peninsula south of a line drawn from Goa to Masulipatam, and across the eastern half of that part of the peninsula which lies north of that line. Over the greater part of this area, and again in the west from the

northern spurs of the Arāvallis to the gulfs of Cutch and Cambay, hard crystalline archæan rocks prevail. Such rocks weather very slowly, and although the process of disintegration has been going on for countless ages, the soil is of no great depth except where it has been washed down from the hill sides into the valleys. The soil from such rock is porous and light, and the rain sinks into it readily. But as the rock itself is comparatively near the surface and is impervious to water, the moisture that the soil receives drains away with rapidity, or is collected in deep hollows of the rock.

140. Between the Archæan region of the Arāvallis and that of the south-west there is a vast area of basaltic rock, known as **Deccan Trap,** which is volcanic in its origin. Through long geological ages that part of India was the scene of vast and recurrent volcanic disturbances, the outflow of which ultimately covered an area of upwards of 200,000 square miles. It forms the entire north-western part of the Deccan and two-thirds of Kāthiāwār, and in successive layers extends to a very great depth, in some places exceeding 6,000 feet. Deccan Trap weathers comparatively quickly, and the resulting soil is dark in colour and very fertile, and is known as the *black cotton soil*. Unlike the soil from the crystalline rocks of the east it retains its water, so much so that it is often described as "water-holding soil." And since, owing to the rapid disintegration of the trap, the soil is generally fairly deep, there is usually a good supply of water a little way below the surface which can easily be tapped by wells.

141. The water-holding power of any soil is of the greatest possible value to the agriculturist. Where the soil has but little such power the effects of drought are very speedily felt, the fields are burnt up and the wells run dry. A water-holding soil, however, may be caked on the surface, but still vegetation flourishes, for as the surface dries the water rises from below. With such a soil it is only after many rainless months that the effects of drought begin to be seen. The cotton soil possesses this power to a remarkable degree. To a less degree it is also characteristic of

most of the alluvial soil of India. This is particularly the case in the valley and delta of the Ganges, where the soil is a mixture of clay and mud, and to a less extent also in the northern part of the great plain between the Jumna and the Indus, where the soil is a light, but not sandy, loam. Passing south-west, however, down the Indus valley, the soil becomes more and more mixed with sand, till in Sind it is little else. The scanty rains which that region receives are quickly absorbed by the light and porous earth; but they evaporate almost as quickly, and the ground is soon perfectly dry for many feet below the surface.

(2) Irrigation

142. By irrigation we commonly mean the watering of the land for the purposes of agriculture by water brought from a distance by means of canals from rivers, or from storage tanks. In many parts of India a sufficient supply of water can be obtained in ordinary years from wells alone. This is the case wherever water-holding soil prevails. Where wells can be depended on there is less need for other sources of supply, though even there a perennial supply of river water may be both cheaper and better for the land. Well-irrigation exists all over India, sometimes alone, and sometimes side by side with other systems, and, taking India as a whole, probably a greater area is watered by wells than by all other systems of irrigation put together. But well-irrigation is chiefly a private work, and land so watered is seldom, in the technical sense, irrigated land. It is probable that irrigation from wells may in some places be taken up by Government, experiments with power-pumps having been made in several places. But so far little has been done in this direction.

143. The rivers and plains of North India are peculiarly suitable for the development of great systems of canal irrigation. The rivers being snow-fed afford even in their upper courses and in the driest seasons a fairly abundant supply of water. This can be drawn off into canals at the

highest part of the almost level plain, and the gentle slope of the plain then gives the fall necessary for steady flow.

144. As an illustration of this system, and as showing the magnitude of the works that have sometimes to be undertaken, we may take the Upper Ganges Canal which has been in operation for upwards of half a century. The Canal head is near Hardwār, a few miles below the junction of the Bhāgīrathi and Alaknānda. At this point the Ganges is a fair-sized river, having a flow of about 7,000 cubic feet per second in the driest season, and much more in the rains, or when the snow has begun to melt. The vast head-works of the Canal are of solid masonry and are so arranged as to draw off about 6,500 cubic feet of water per second. This great volume of water is taken in a south-westerly direction across the course of other mountain streams which it does not disturb. It passes under one by means of a tunnel, and is carried over another by an aqueduct two miles in length. Then it bends to the south, and by means of main channels over 450 miles in length, and smaller distributaries with a total length of almost 4,500 miles, waters an area of 1,500 square miles of land between the Ganges and the Jumna. A little lower down, when the Ganges has again become a river of considerable volume, another canal takes off an almost equal quantity of water.

145. Similar canals are taken from almost all the main tributaries of the Ganges and Indus, and some are of even greater magnitude. The Sirhind Canal from the Sutlej waters more than 1,200 sq. miles of the Panjab, as well as large tracts in the Native States of Patiāla, Nābha and Jind. Its main channel exceeds 500 miles in length, and has over ten times that length of distributaries. The Lower Chenāb Canal has a main channel of 427 miles, and waters the large area of 3,040 square miles. The Jumna, the Rāvi, the Jhelum and the Gandak, provide water for other canal systems which give a perennial supply to many millions of acres. In the Punjab alone 8,250 square miles of land are thus watered.

146. In the canals already mentioned the supply of water is constant, the head-works being so constructed as to draw off a sufficient volume even when the river is at its lowest. In the lower course of the Indus a different system is adopted, the canals being filled only during the time that the river is in flood. Such canals are distinguished as **Inundation Canals.** The Indus,

owing to the high level of its bed, offers special facilities for this system, which, though not affording so perfect a protection, has the advantage of cheapness. The solid masonry canal heads necessary for the perennial canals give place to simpler earthworks, and a much smaller capital expenditure is required. While the Upper Ganges Canal has cost over £2,000,000, and the Sirhind and Lower Chenāb Canals each not very much less, the Indus Inundation Canals, with over 650 miles of main channels, have cost less than £100,000. Sind is almost entirely dependent upon irrigation of this kind.

147. In the peninsula canal irrigation from the rivers is much more restricted than in the northern plains, since the rivers, not being snow-fed, do not offer a continuous supply of any great volume until they are comparatively near the sea. Small canals, however, draw their supplies from the upper reaches of the Godāvari and Kistna; and the Sōn, shortly before its confluence with the Ganges, supplies canals which irrigate a considerable area in Bihār. But it is in the deltas of the rivers that the great irrigation works of the peninsula are found. The waters of the Mahānadī, the Godāvari, the Kistna and the Cauvery are all thus utilised, as well as those of some of the smaller rivers. An *anicat*, or masonry dam, is thrown across the river near the apex of its delta, which prevents the water draining away too rapidly to the sea. The level of the water above the anicat is thus considerably raised, and a slight fall secured that enables it to be easily distributed throughout the delta and to some extent further inland. The irrigation systems that water the deltas of the four great rivers that discharge into the Bay of Bengal have over 2,000 miles of main canals and 5,300 miles of distributaries, and give an unfailing supply of water to over 4,000 square miles of exceedingly fertile land.

148. Irrigation in the interior of the peninsula is, however, chiefly from **tanks.** We have seen that the rivers are in flood for only a short time, and that over the whole of the eastern and southern half of the peninsula the ground is such that the water speedily drains away. The problem to be solved is, therefore, how to hinder the water

that floods the land during the rainy season from running to waste. This is solved by storing it in "tanks" where it is available for future use. These tanks are of all sizes, from mere ponds to lakes five or six miles in length. They are usually constructed by throwing a dam or bund of masonry or earthwork across a narrow valley through which a stream passes, thus confining the natural drainage. Or sometimes these tanks, or lakes, are constructed at some distance from a river whose waters are artificially turned into them. The water is then distributed over the surrounding country by a network of channels.

149. In the Madras Presidency alone there are 60,000 such tanks of all sizes. Many of them are ancient works, but most of the greatest have been constructed in recent years. One notable illustration may be mentioned—the **Periyār Project,** as it is called. The Periyār is a river on the western side of the Western Ghāts, whose waters used to be lost in the Arabian Sea. They are now diverted and carried through a tunnel under the Ghāts to the eastern side of the hills where water was greatly needed. They supply a vast artificial lake capable of watering more than 300 square miles of land.

150. Indian irrigation works surpass in extent and utility anything else of the kind in the whole world. The total capital outlay upon them up to the end of 1906 exceeded £31,000,000. The payment received from the cultivators for the water supplied meets all the working expenses and returns a fair interest on this large sum. The extent to which such works increase the wealth of the country, and especially of the ryots, is best seen from the fact that in seasons of only slight scarcity the value of the crops raised on irrigated land, *and which, but for irrigation, could not have been raised at all,* exceeds the whole capital outlay on the works themselves.

(3) Forests

151. The forests of India constitute a valuable part of the natural resources of the country, because of the timber they provide, and they are of further importance because of their influence on climate and rainfall. Forests protect the hill-sides, the roots of the trees binding the soil and

hindering it being washed away. They also check evaporation, and so preserve the moisture of the soil. And, what is of still greater moment, wherever a *large extent* of forest occurs its comparatively cool area is frequently sufficient to attract the clouds and determine a downpour of rain, which, when once started, spreads far beyond the actual

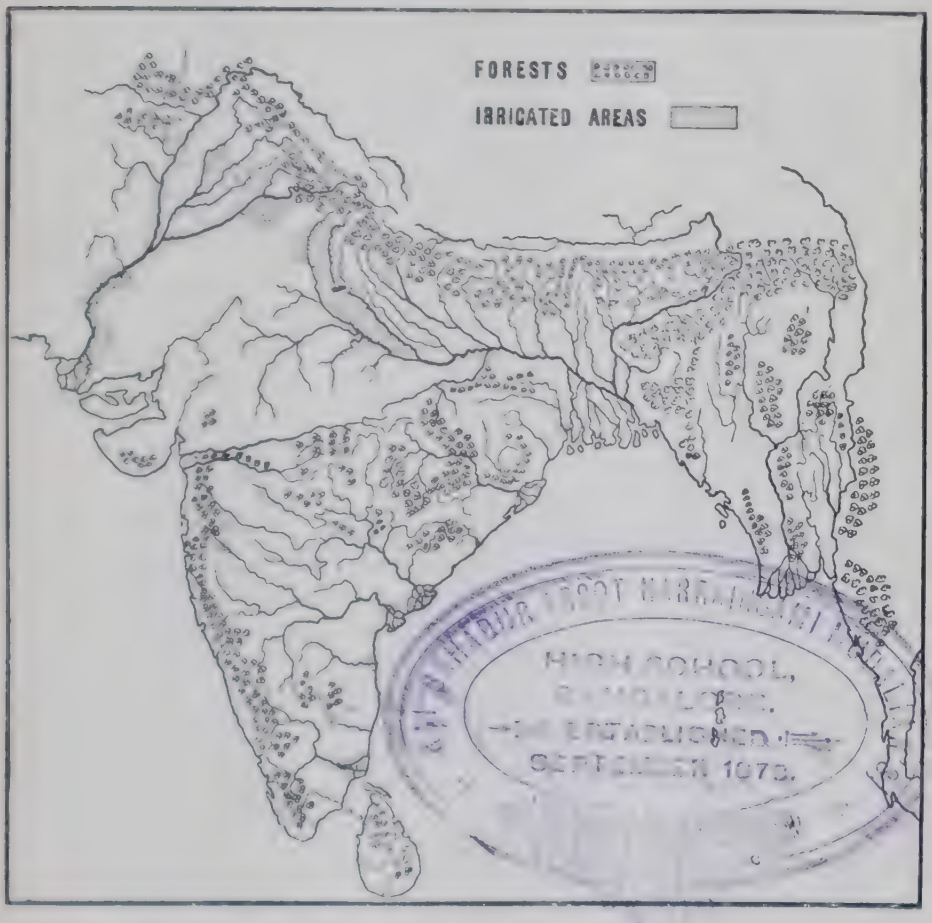


Fig. 32. Showing the forest areas and the areas under irrigation.

forest area. Forests are of importance for another reason. They encourage and protect the undergrowth of grass and small shrubs, which constitute an invaluable grazing ground when vegetation on the more exposed land is burnt up.

152. It tradition is to be believed the forests of India covered at one time the face of the whole land. But for centuries they

have been exposed to indiscriminate destruction. No steps were taken for their preservation till 1846 when conservancy operations were begun in Bombay. Ten years later this example was followed in Madras. In 1861 the **Forest Department** of the Government was created, and the work thus begun was completed by the *Forest Act of* 1878, which gave to India a complete, scientific, and efficient system of forest administration. In all the Provinces there are now large areas of "reserved" forests, which are entirely under the control of the Department, as well as other, and in some Provinces considerably larger, areas which are demarcated and efficiently protected. The objects which the Department has in view are (1) the protection of such forests as now exist from damage through unscientific felling of timber, or from fires; (2) the extension of the forests by planting suitable and useful trees over areas reserved for the purpose; (3) the production of as much good timber and firewood as the forest can yield without injury; and (4) the provision of grazing areas which can be relied on in times of drought. The total demarcated forest in British India is over a quarter of a million square miles, or about twice the area of the British Isles.

153. Numerous valuable timber trees are native to the forests of India. Of these by far the most important is **Teak.** The tree is found chiefly in the forests of Burma and the Western Ghāts, in both of which regions much attention has been given to its cultivation. About 150,000 tons of teak are exported from Burma yearly. It is floated in vast rafts down the rivers, particularly the Salwīn. Teak is a hard and durable wood, and until it is very old is not attacked by white ants. It is, therefore, specially useful for building purposes and for furniture. The **Sāl** is found in great abundance in the forests of the Himālayas and the Central Provinces. Its wood is hard and heavy, and is used for building purposes and railway sleepers. The **Sissoo** is also characteristic of the Himālayan forests. Its wood is of a rich dark brown colour, hard and capable of a fine polish, and is used for furniture. The **Blackwood** is found chiefly on the Western Ghāts. Its heart-wood is a deep reddish-black, hard and firm, and is greatly used for carved furniture and decorative work.

The **Sandal** grows in the drier parts of the peninsula, especially in Mysore. It is cultivated by Government in the Central Provinces. The heart-wood has a lasting fragrance, and is much used for carving, and as a perfume. It is also employed in the manufacture of incense, and is exported for this purpose. The **Khair** and the **Toon,** both of which are common in the N.W. Himālayas and Burma, yield red woods used for furniture. The heart-wood of the former is dark in colour and very hard and durable, and is valuable for building. The **Deodār,** a kind of cedar, along with various species of **Pines,** are the chief trees in the higher forests of the Western Himālayas. The **Ebony** tree grows on the Western Ghāts, and in Burma the **Ironwood** tree is next in importance to the Teak.

154. The forests yield other important products besides timber. From the heart-wood of the *khair* **Cutch,** or **Catechu,** an astringent gum-resin used both in tanning and as a medicine, is obtained. **Myrobalans,** the dried fruit of several species of *terminalia,* are also a valuable tanning material. They are exported in considerable quantities. **Caoutchouc,** or **India rubber,** is obtained from the milk which exudes from incisions in the stem of the *rubber tree,* a species of fig, which is found in the eastern Provinces of the Empire. Great attention has been paid of late to the cultivation of this tree, and Government plantations have been started in Bengal, Assam, and Burma. Two other species of the same genus, the **Banyan** and the **Peepul** are common in most parts of India. They are large and handsome trees, but are not of any great economic value. The Peepul is a sacred tree among the Hindus. The **Bamboo,** a giant grass, is common in almost all parts of India where water is plentiful, up to an elevation of 3,000 feet. It is an important forest product, the reserved forests yielding in a single year nearly 100 million canes.

155. Many trees not indigenous to India have been introduced of recent years. The most notable of these are various species of **Eucalyptus** which have been introduced from Australia and of which there are now extensive plantations on the Himā-

layas, Nilgiris, and Palnis, where they flourish exceedingly. The leaves of these trees contain an aromatic resin, and their cultivation is said to counteract malaria. The tree grows to an immense height, but develops so quickly that its wood is of little use except for fuel. The **Rain Tree** is also spreading in the hotter plains. It grows with great rapidity, spreading its branches over a wide area, and giving a thick and welcome shade. The **Casuarina** is another quick-growing tree, which is cultivated in many places along the coasts of the peninsula. Large Government Casuarina plantations have been established on the east coast. The straight poles of the trees are used for scaffolding, but the chief value of the casuarina is as a source of excellent firewood.

(4) Food Grains

156. Rice. Of all the food grains of India rice is the most important. It is the staple food of more than a fourth of the people, and a common article of diet of at least as many more. Rice requires for its cultivation an abundant supply of water and warmth, and is therefore chiefly grown in those districts on the plains which have a copious rainfall or are well irrigated. The rich wet plains of Bengal form one of the largest and most productive rice-fields in the world, though their produce does not equal in quality the Carolina rice of the United States. Out of about 74 million acres devoted to rice culture in British India, 36 millions are in Bengal alone. Lower Burma is also a

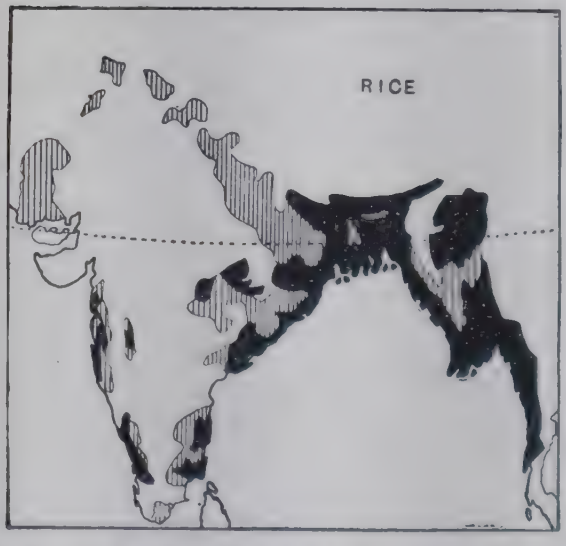


Fig. 33. In the areas printed black more than half the cultivated land is devoted to rice. In the other shaded parts more than a quarter.

great rice-producing Province, but its total output is less than one-fourth that of Bengal. In both these Provinces rice is the main food of the people, but while the vast population of Bengal consumes almost the whole of the rice grown in the Province, three-fifths of the crop of Lower Burma is available for export. Rice is also extensively grown in the deltas of the peninsular rivers, and wherever the conditions of the country are favourable.

157. **Wheat** is cultivated largely in North and Central India, and is a cereal of increasing importance, both as a staple food of the people and as an article of export. It requires for its cultivation much less water than rice. When young it can stand keen frosts, but after the ear is formed it needs a dry air and bright sunshine to bring it to perfection. The plains of Northern and Central India, especially towards the west, are thus well adapted for its growth. Indian wheat is hard and of excellent quality, and is growing in favour in Europe. Its cultivation is, therefore, spreading, and its export rapidly increasing.

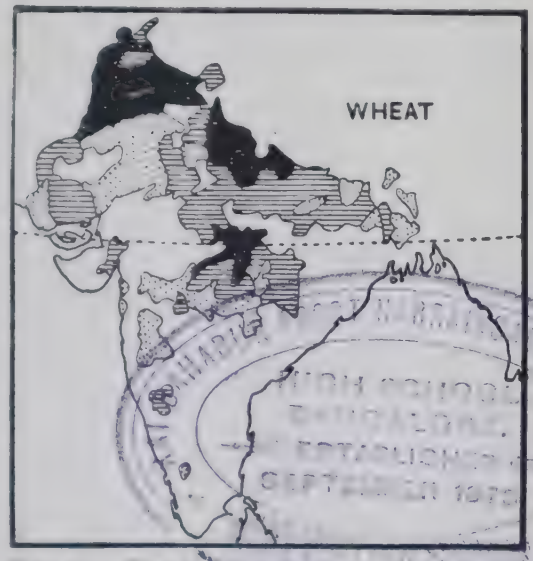


Fig. 34. The black areas are the centres of wheat cultivation. It is less abundantly grown in the districts shaded with lines, and still less in those shaded with dots.

In the year 1907 the extent of land devoted to wheat culture in British India was 25 million acres, against 73½ million acres devoted to rice. The total rice crop was about 21 million tons, and the wheat crop exceeded 8 million tons.

158. **Millets.** The chief millets grown in India are **cholum** (or *jowar*), **cumbu** (or *bajra*), and **ragi.** They

require much less water than rice and take the place of that grain in most of the drier Provinces of India. In all but the great rice-producing districts of the peninsula millets form the staple food of the poorer people, rice being a luxury of the wealthy. In Bombay, Sind, and Berār more than half of the total area devoted to food grains is given up to millets, and more than one-third in Madras and in at least half the Districts of the Punjab, Agra, and Upper Burma. Taking British India alone the millets are not so important a food crop as rice, but if the Native States be added, the majority of which are less abundantly watered than the British Provinces, they are more important, and form the staff of life to a larger number of people.

159. **Pulses.** Various pulses, the chief of which are **Gram** and **Dāl**, are widely grown in the United Provinces and the Punjab, and less extensively in other Provinces. They are valuable as foods, being more nutritious than either rice or millets, because of the larger proportion of nitrogenous matter they contain. They are eaten in combination with less nutritious grains almost all over India.

160. **Barley** is grown in the United Provinces, and to a less extent in the Punjab and Bengal. It is less nutritious than the millets, but is cheaper, and is, therefore, largely used by the poorer classes. Barley is also extensively used for brewing.

161. **Maize**, or **Indian Corn,** is also cultivated in these Provinces, and to a less extent in many other parts of India. It is nowhere, however, a crop of first importance.

(5) Other Vegetable Products

162. **Palms.** Various species of Palms are common throughout the plains of India, and on the hill sides, though being an essentially tropical order they do not flourish at any great height. By far the most useful of these is the **cocoanut.** It loves a well-watered, sandy soil, and flourishes all round the coasts of the peninsula, and

particularly around the backwaters of Cochin and Travancore. It is also largely cultivated in the interior. The chief products of the cocoanut are **copra** and **coir**. *Copra* is the dried kernel of the nut from which cocoanut oil is expressed. *Coir* is the fibrous husk of the nut, which is woven into coarse matting and rope. There is a considerable export of both copra and coir from the ports of the West Coast. The **Palmyra** palm which is common all over the peninsula, but cannot stand the cold nights of the north-west, is chiefly of value as a source of "toddy," which is the sap drawn from the flower stalk and slightly fermented. The **Areca** palm, cultivated chiefly in Bengal but found almost wherever the cocoanut grows, yields a nut which is chewed all over India along with the leaf of the *betel*, or pepper vine. A species of **date** palm, known as the *bastard date*, is found all over India, particularly in Bengal, and is one of the chief sources of **jaggery**, or native sugar. The true date, the fruit of which is of great value in Arabia and North Africa, needs a dry, hot climate, and brings its fruit to perfection only in Sind. The wood of all the palms is used for temporary buildings, and the leaves make an excellent and durable thatch.

163. **Fruits and Vegetables.** Many kinds of fruit are grown in India, the most universal and useful of which is the **plantain** or **banana**. The **mango**, one of the most luscious fruits in the world, is abundant, and much attention has in some places been given to its culture. **Oranges** of excellent quality, **limes** and **figs** are cultivated in many parts. The **jack fruit**, the **papaw**, **custard apples**, **guavas**, **pomegranates**, **melons**, and **pineapples** are also common. On the hills many kinds of European fruit have been introduced **apples**, **pears**, **plums**, **strawberries**, etc.—and in some places with fair success. The same is also true of European vegetables. **Peas**, **beans**, **cabbage**, **cauliflower**, etc., are grown on the hills and on the Deccan plateaux, and **potatoes** have taken kindly to the country and are now grown even on the plains. The vegetables native to India are very numerous, but of little importance. The most useful are the **sweet potato**, a species of convolvulus,

and the **brinjal**, or egg plant. But a tropical country, especially where the rainfall is precarious and confined to particular seasons, is not well adapted to the cultivation of succulent fruits or vegetables. The temperate regions are richer both in the variety and quality of these products.

164. Oil Seeds. About 14 million acres in British India are devoted to the cultivation of various seeds which are valuable chiefly for the oil which they contain. The largest areas of cultivation are in Bengal, the Central Provinces, Bombay, and Madras. The greater part of the crop is annually exported, the shipments in 1904–5 representing a value of nearly 10 millions sterling. **Linseed** is the most important of these seeds, and accounts for nearly half their total value. Linseed oil is a *drying* oil, and is used for mixing paints. **Rapeseed** yields rape, or colza oil, which is used for lamps and for lubricating. **Sesamum (til or jinjili)** seed yields an oil much used in India for bathing purposes. **Cotton** seed, **mustard** seed, and **ground nuts** yield oils which are used in the manufacture of soaps. The last two are also used in the manufacture of sweetmeats, chiefly in France. There is a considerable export of ground nuts from Pondicherry to French ports for this purpose. **Castor** seed yields an oil valuable as a medicine. The dry residue of these seeds, after the oil has been expressed, forms **oil cake**, a useful food for cattle. Linseed cake, rape cake, and cotton cake are especially valuable.

165. Sugar. The sugar cane is largely grown in the United Provinces, Bengal, the Punjab, and the North Western Frontier Province, and to a less extent in other parts of India. In the whole of British India, nearly $2\frac{1}{2}$ million acres are devoted to its cultivation. It needs abundant water, and is therefore grown on irrigated land. The total crop in an ordinary year yields about 2,000,000 tons of sugar, or about four-fifths of the entire amount consumed in the country.

166. Tea is the fermented and dried leaves of a shrub native to the forests of Assam. The production of tea in India has increased enormously of recent years. Its cultivation on any large scale is, indeed, entirely a develop-

ment of the last half-century. In 1830 the Government established a small plantation of the China shrub on the slopes of the Garhwāl Himālayas, and China tea is still grown there, chiefly for export by land to Tibet and Central Asia. About the same time the shrub was discovered in the forests of Assam. During the next quarter of a century experimental cultivation, gradually increasing in extent, was carried on in many places, but it was not until about forty years ago that the Indian Tea industry really began; and in Ceylon it was ten years later. In 1865 only 2 per cent. of the tea used in Great Britain came from India, and none from Ceylon; in 1907 India supplied 54 per cent., and Ceylon 36 per cent. In the last twenty years the output of Indian tea has increased threefold. The area devoted to tea in British India is over half a million acres, more than nine-tenths of which are in Bengal and Assam. The rest is on the hills of the Punjab and the United Provinces, and the Nīlgiris and Palnis in Madras. There are also about 24,000 acres of tea in the State of Travancore. The value of the tea annually exported is from five to six millions sterling.

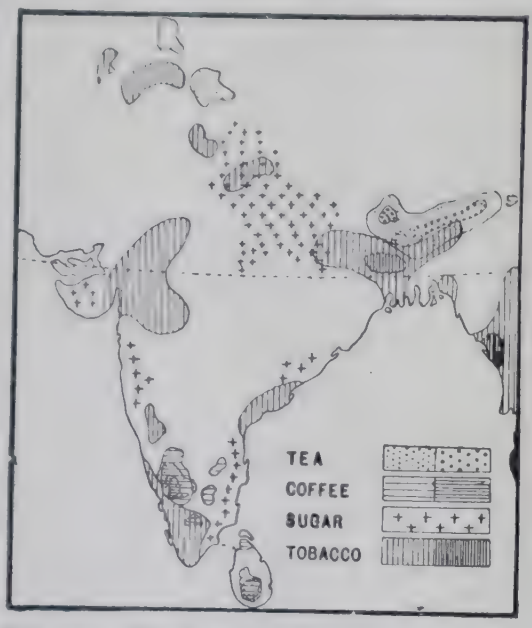


Fig. 35. Showing the districts where tea, coffee, sugar and tobacco are grown. The darker shading shows more extensive cultivation.

167. **Coffee** is the dried berry of a shrub said to have been introduced into India from Arabia, where it grows in great perfection. For some years coffee culture has been declining in India. Bad seasons and the ravages of insects have done much to discourage planters, and the

decline in prices has made the cultivation unremunerative. Indian coffee at the best can hardly compete with Brazilian. The area devoted to coffee at present is under 100,000 acres, of which more than three-quarters are in Mysore and Coorg, and the rest on the Nīlgiri Hills and the Western Ghāts. Comparatively little coffee is used in India, and the bulk of that grown is exported to Great Britain. The total export for 1907 was about 25,000,000 lbs., and its value £660,000.

168. Spices and **Condiments.** Of these India has no great variety. **Chillies** and **turmeric** are grown in most parts and are universally used. **Coriander, aniseed, ginger,** and **cummin** are also cultivated. Several species of **pepper** are grown along the Malabar coast strip, and in Travancore **cardamoms** are a valuable Government monopoly.

169. Opium is a powerful narcotic drug obtained from a species of poppy. Shortly after the plant has flowered incisions are made in the green capsule. The juice which exudes solidifies on the outside of the capsule, from which it is daily collected. Cleaned and further dried this exudation constitutes the crude opium of commerce. Opium is an exceedingly valuable medicine. It is also widely used as an article of vicious indulgence. For this purpose it is commonly smoked, or small quantities of it are swallowed, or an infusion is made and drunk. In whatever form it is used it acts first as a stimulant and then as a powerful narcotic and soporific. It has long been widely used as a luxury by many classes in India, notably the Sikhs and Rājputs; and, in parts of Bengal, Assam, and Burma, it is relied on as an antidote to malaria.

170. Following the example of the Mughal Emperors the British Rulers of India early made opium a Government monopoly. In British India it is produced chiefly in Bihār and the United Provinces, where the cultivators grow it under official inspection, the Government making advances on the crop, the whole produce of which is handed over to their agents. The central Government Opium Depôts are at Patna and Ghāzīpur. There the opium is packed in chests and forwarded to Calcutta, where it is sold by auction for export. Opium is also grown in

the Native States of Central India and Rājputāna. From some of these States large quantities of the drug are despatched to Bombay for export. This is known as **Mālwā Opium**, and is subject to a very heavy tax as it passes through British territory. The area devoted to the culture of opium in the Ganges valley is about 600,000 acres, and the value of the crop is usually nearly 5 millions sterling. About 93 per cent. of the entire produce is exported, chiefly to China.

171. **Tobacco** is not a native of India, but was introduced by the Portuguese. It is now grown and used in every Province, but most extensively in Bengal, Madras, and Burma. The area under tobacco in British India in 1907 was over a million acres, more than half of which was in Bengal. Much of the Bengal tobacco goes to Burma, where smoking is a universal habit. A small quantity of manufactured tobacco is exported to Europe.

172. **Cinchona.** The Cinchona tree is grown for its bark, which is the source of **quinine**, the most useful of all febrifuges. Cinchona was introduced into India in 1860, prior to which time it was almost confined to South America. There are now large Government Cinchona Plantations on the Nīlgiris and at Darjeeling, and numerous private ones. The tree is also grown on many coffee estates, being planted between the coffee bushes. At the factories on the Government plantations quinine and a mixed febrifuge are manufactured and are supplied to the public at a cheap rate. Quinine is also supplied to the public through the Post Offices, where it is sold in small *pice* packets. An abundant supply of a cheap and effective febrifuge is of the greatest importance where fever is so prevalent as in India.

173. **Indigo** is a dark blue dye extracted from the leaves of a small annual plant by maceration in water. The indigo crop used to be of great value, but the dye is being rapidly superseded by a chemical product which is much cheaper though not so good. Indigo culture is consequently rapidly declining. Between 1880 and 1890 the value of the indigo exported from India averaged over 2½ millions sterling. It has now fallen to about one-fifth

of that amount. Indigo is chiefly grown in Bengal, Madras, the United Provinces and the Punjab, four-ninths of the entire amount produced being grown in Bengal, and half the remainder in Madras.

174. Cotton is the soft fibre which enfolds the seeds of a small annual plant which has been cultivated in India for many centuries. It grows with great luxuriance on the rich black soil of the Deccan Trap, which has thus earned the name of "cotton soil." Cotton is one of the most important agricultural products of India, for it is not only one of the main articles of export, but, what is of still greater moment, is the raw material of a considerable and growing local manufacture. Great efforts have been, and are still being made to improve the quality of Indian cotton. At present it is not equal to the American variety, which has a longer fibre and is therefore more easily worked, and of greater strength. Careful cultivation, and the introduction of the American species, will probably overcome this difficulty and make Indian cotton equal to any in the world. Cotton cultivation is steadily increasing in India. At present, about 19 million acres are devoted to it, 14 millions of which are in British India and 5 millions in the Native States. The value of raw cotton exported in 1907 was over £14,600,000. The greatest cotton-growing Provinces are Bombay (including the Native States), Berār, and the Nizām's Dominions, but it is extensively grown also in Madras, the United Provinces, the Punjab, and the Central Provinces.

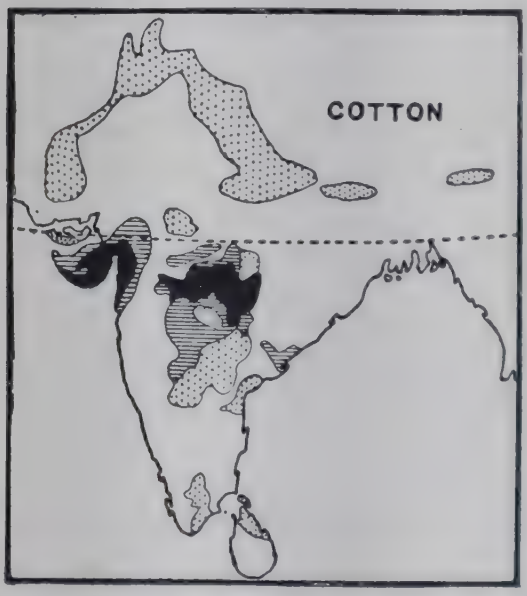


Fig. 36. In the districts marked black cotton is most extensively grown; next the districts shaded with lines, and then those shaded with dots.

175. **Jute** is the fibre of a quick-growing herbaceous mallow, which usually attains a height of eight to ten feet within four months of sowing, and often reaches twelve feet. It is then cut and the stalks are left for some weeks to soak in water when the fibre is easily extracted and cleaned. Jute is grown almost exclusively in the Gangetic delta, where over 3 million acres are devoted to it. Although it exhausts the soil upon which it grows to such an extent that it is usually allowed to lie fallow one year in four, it is nevertheless a most valuable crop. Not only does the fibre realise remunerative prices, but the plant can be grown on land exposed to such severe floods that any other form of cultivation would be extremely precarious. The value of the export of raw and manufactured jute in 1907 was over £28,000,000.

(6) Mineral Produce and Resources

176. **Coal.** There are several valuable coal fields in India, some of which are being successfully worked. The most important of these is in Bengal, south of the Rājmahāl Hills, from which point it extends westwards to the valley of the Sōn, and from thence south-eastwards through Chotā Nāgpur to Orissa. Another large field is in the valley of the Godāvari stretching north-west from the Ghāts to beyond Warorā, and extending westwards into the Nizām's Dominions. A smaller field is in the basin of the Narbadā, south of Jubbulpore. In Assam there are several coal fields in the valley of the Brahmaputra, where coal of a better quality is found. In the Native State of Rewah is another field which is being successfully worked. In Burma there are some promising fields, but little mining has as yet been attempted.

177. At present by far the largest output of coal is from the Bengal mines. The chief **collieries** are near **Rāniganj,** and at **Jherriā** and **Giridhī.** In the Central Provinces there are mines at **Warorā** (worked by Government) in the Godāvari coal field, and at **Mohpāni** in the Narbadā field. In Hyderābād the **Singareni** mines are very successful and pro-

ductive. So, also, though on a smaller scale, are the **Umariā** mine in Rewah (which, like the Warorā mine is worked by Government) and the **Mākum** mine in Assam.

178. The total output of coal from Indian mines in 1907 was over 11 million tons, of which nearly 10 million tons came from Bengal alone. This was sufficient to supply the chief needs of the country, and to leave a million tons for export to Ceylon and the Straits Settlements. The import of coal from England has fallen during the last twelve years from three-quarters of a million to a quarter of a million tons.

179. Iron. There is an abundance of iron ore in India, and much of it is of excellent quality. Especially rich ores are found round Salem in the Madras Presidency, in the Raipur District of the Central Provinces, and in Orissa. At one time large quantities of iron were produced in India. But the native system of smelting needed an abundant supply of charcoal, and the decay of the industry was due in part to the decline in the fuel supply, owing to the wholesale destruction of forests. Native smelting is still carried on by isolated groups of metal workers, but the quantity of iron produced is very small, and there is now no possibility of a revival of the industry, as imported iron is much cheaper.

180. Iron can only be profitably worked in India where, along with the ore, coal and some form of limestone are found, the latter being needed as a flux. If either of these has to be brought from a distance the cost of carriage makes the work unremunerative. At Rānīganj, in Bengal, these conditions exist, and iron-works have been established there which smelt about 70,000 tons of ore a year. But the great bulk of the iron used in India is imported from Great Britain and Belgium.

181. Gold. This precious metal has for ages been found in India. Gold commonly occurs embedded in quartz, a hard crystalline rock of the most ancient geological formation. Rivers which cut their way through such rock almost always bring down more or less gold, which is deposited along with the other *detritus* which forms their alluvium. Often, through the greater weight of the

particles of gold and the variation in the speed of the current, the metal is deposited in particular parts of the river bed. All the greater rivers of India cut through archaean rock, and almost all of them have in the past yielded gold. This is particularly the case with the Brahmaputra, the Irrawaddy, the Godāvari, and the Himālayan rivers just as they emerge from the hills. Washing the river sands for gold is still a favourite occupation of many of the hill tribes, and small quantities of the metal are thus obtained.

182. In Mysore, the Wynaad, and Hyderābād, the rich gold-bearing quartz is mined. It is then crushed and washed. The process is costly, and many mines sunk during the last quarter of a century have not found quartz sufficiently rich in gold to pay for working. Large numbers of ancient, disused, mines exist, which were doubtless the main source of the gold for which India was famous many centuries ago. Almost all the gold now produced in India comes from the **Kolār** mines in the Mysore State, which for some years have yielded about £2,000,000 worth per annum.

183. Salt. Of all the mineral products of India salt is in many respects the most important. Native salt supplies the needs of the entire empire, save the Provinces of Bengal and Burma, and forms considerably more than two-thirds of the whole amount consumed. Of imported salt more than half comes from England, more than a third from Arabia, and most of the rest from Germany. The Indian supplies are from three main sources: (1) the sea coast, (2) the salt lakes and pits of Rājputāna, of which by far the most important is the Sāmbhar Lake, and (3) the salt hills of the Punjab and the North-Western Frontier Province.

184. Along the sea coast salt is manufactured from the sea water by solar evaporation. Both in the Madras and Bombay Presidencies the manufacture is carried on partly at Government factories, but chiefly at private ones under Government license. The Madras salt supplies the whole of South India, the east coast including Orissa, and the eastern part of the

Central Provinces. The coast factories of Bombay supply the chief needs of Bombay and Sind, and a part of the Deccan. On the Rann of Cutch the Government own the Pritchard Brine Works which yield a large quantity of excellent salt, most of which goes to the United Provinces, Central India, and the Central Provinces.

185. The Sāmbhar Lake—a lake about 20 miles long, lying a little to the north-east of Ajmere—has water so salt that in dry seasons the crystals gather on the surface to a thickness of six or eight inches. Vast quantities (about one-seventh of the whole produce of India) are taken from it without appreciably diminishing the salinity of its water. What the source of its salt may be is a matter of conjecture. The Sāmbhar Lake, together with brine springs at Pachbhadra in the Jodhpur State, 180 miles to the south-west, supply Rājputāna, and a great part of the United Provinces, Central India, and the Central Provinces.

186. In the north-west corner of India ranges of hills containing vast quantities of rock salt stretch east and west on both sides of the Indus. The name Salt Range is, however, confined to those on the east side of the river. There are numerous mines both in the Salt Range proper and in the hills of Kohāt west of the river, and in the latter district, where the salt crops out, it is quarried like stone. From these mines and quarries a cheap and plentiful supply is obtained for the Punjab, the North-Western Frontier Province and Kashmīr.

187. Petroleum. There are three valuable petroleum fields in Burma, the produce of which is rapidly increasing. These are, in the order of their yield, the Yenangyaung, the Singu, and the Yenangyat fields. The crude oil is obtained in wells and has then to be purified. The yield of petroleum in 1907 was over 150 million gallons, which is more than three-fifths of the entire quantity consumed in India. The imports of petroleum in the same year fell to 60 million gallons. Not many years ago three-quarters of the petroleum used in India was imported, now little more than a quarter. The Burma fields thus promise at no very distant date to supply the entire needs of India. A considerable quantity of petroleum is also obtained at Mākum, in Assam.

188. Manganese ore is found in Madras, near Vizagapatam, and, in unusual richness and purity, in the Central Provinces and Central India. The amount raised has increased twelve-fold during the last eight years, and in 1906 nearly half a million tons were exported. Manganese is used chiefly in the manufacture of steel.

189. Mica of excellent quality is found in Bengal, and in smaller quantity in Madras. About 2,000 tons are shipped to Europe yearly. **Saltpetre** is found in Bengal, as well as in some of the other northern Provinces, and about £250,000 worth is exported yearly. **Copper** also exists in Bengal, but is not as yet worked. **Plumbago** is found in Travancore. **Tin** exists abundantly in the southern parts of Tenasserim, but is not worked to any large degree.

190. Precious Stones. Burma has valuable **ruby** mines. Indeed, of the best stones it has a monopoly, and supplies the world. Along with the rubies a few **sapphires** are also found. The Mines are worked by a Company who hold them on lease from the Government. The Company also grants mining licenses to private individuals who make no return of their finds. The total output is, therefore, difficult to discover. **Jade,** a green stone greatly valued by the Chinese, is also found in Burma. Valuable **diamonds** have been found in the past in the Godāvari basin, and are occasionally found now. But there is no systematic mining for them.

(7) Wild Animals

191. The **lion** is now found only in Kāthiāwār, and though for many years it has been rigidly preserved, it is almost extinct even there. The **tiger** is found in most parts of India wherever extensive forests or jungles exist. **Tigers** abound in the Terai, the jungles of the Sandarbans, and the forests of Central India and the Western Ghāts. The **panther,** or leopard, is still more common. The **cheetah,** or hunting leopard, is a different species, and is native only to the Deccan. It is trained for hunting the antelope, but though swift and sure in attack has no staying power. **Wolves** abound still in the open country but shun the forests. The common **black bear** is met with in the forests of rocky hills, and the Tibetan **sun bear** is found throughout the whole length of the Himālayas, but only at heights of over

5,000 feet. **Hyænas** are numerous, but only where the wolf is not. **Jackals** are common everywhere and are useful scavengers. The **wild dog,** which hunts in packs, is found in the forests of Burma and Assam.

192. The **wild elephant** exists chiefly in the forests of Eastern Bengal and Assam; less commonly in those of Burma and the Indian peninsula. Under a special Act of the Indian Legislature the elephant is strictly preserved, and can only be captured by license. Considerable numbers are caught and trained for the Government service and for sale. The elephant is not found at all in the north-west of India, where the climate is too dry and the temperature too variable for him. Several species of **rhinoceros** haunt the swamps of the Brahmaputra valley, the Sandarbans, and Chittagong; and their horns are valued by certain classes of the natives. The **wild hog** is common in most Provinces in the vicinity of cultivation, and hunting him is a dangerous and exciting sport. The **wild ass** roams in herds of 20 to 50 in the deserts of Sind and Cutch, and several species of **wild sheep** and **goats** have their home on the Himālayas, the mountains of the north-west, and the Sulaimān range. The **ibex,** a species of goat, is found on the mountains of the peninsula and Kashmīr. **Antelope** are fairly common in Central India and in the coast flats of Gujarāt and Orissa. **Bison** are met with in the hill jungles of South India and Burma, and the **wild buffalo** in Burma and Assam. Of **deer** there are many species, the chief being the **sambur. Monkeys** of many kinds are exceedingly numerous almost everywhere. Rats and mice abound throughout the land, and the **bandicoot,** the most gigantic member of the tribe, is exceedingly destructive.

193. Of reptiles, **snakes** and **scorpions** of many kinds are everywhere found. The largest Indian snake is the **python,** which sometimes attains a length of 30 feet. Most of the snakes found in India are harmless, but there are three or four whose bite is deadly, and for whose poison no effective antidote is known. One of the worst of these, and at the same time one of the commonest, is the **cobra di capello.** Numerous poisonous water snakes are also found. The blunt-nosed **crocodile** infests swampy rivers and backwaters, and the sharp-nosed species, the **ghavail,** which preys only on fish, is numerous in some of the greater rivers, especially the Ganges, Brahmaputra, and Mahānadī.

194. The destruction of life and property by wild animals and snakes is very great, and shows little tendency to decline. The total number of persons killed by wild animals (chiefly tigers and leopards) in 1904 was 2,157, and of cattle 88,206. Poisonous snakes are ten times as destructive of human life, but not so fatal to cattle. Deaths from snake bite in 1904 numbered 21,880, and the number of cattle killed by snakes was 10,376. Rewards are given by the Government for the slaughter of poisonous snakes and many species of dangerous wild beasts.

195. The birds of India are very numerous and beautiful, but are more esteemed for the gaiety of their plumage than for the sweetness of their song. **Parrots** abound, and many kinds are made household pets, as also is the **maina,** a species of starling which can be taught to talk. Small winged game exists in great variety, including **snipe, partridge, quail, plover, teal,** and **wild duck.** The **peacock** is found in the forests of the Deccan, Assam and Burma; the **pheasant** in the Himālayas; and the red **jungle-fowl,** from which domestic poultry are said to have been derived, is met with in most parts. The common **crow** is familiar everywhere.

196. Of birds of prey the **vulture** and the **kite** are the best known. They are everywhere useful scavengers. **Eagles** are numerous in the Himālayas. Several species of **falcon** are trained by the natives for hawking purposes. **Hawks, herons,** and **kingfishers** of many kinds abound, and the last is much sought after for its beautiful plumage.

197. **Fish** of many excellent varieties abound in all the rivers and most of the tanks. The best river fish belong to the carp and barbel families. The **mahsir,** sometimes called the Indian salmon, is found in the hill streams both of the Himālayas and the peninsula, and grows to a great size. The **hilsa** is a similar fish, though smaller in size, which abounds in the streams of the Gangetic delta. All round the coasts salt water fish is caught in great abundance, and the fisheries are a source of wealth to many thousands of people.

198. As in every tropical country insect life is abundant in India. **Ants** of many species are found everywhere, and though destructive, they are of immense use as scavengers, for they quickly remove every particle of decaying animal matter. The most destructive of all insects, and one that has to be con-

stantly guarded against, is the **white ant,** or **termite.** The **mosquito** is, perhaps, the greatest of insect plagues, and where it abounds renders life almost unendurable. Fierce war is waged against the mosquito now, as one species has been proved to be the chief distributer of malarial poison. Of useful insects the **bee,** the **silk-worm,** and the **lac** insect are cultivated.

(8) Domestic Animals

199. **Horses** and **ponies** are common in every Province of India, but in relation to the population are most numerous in the Punjab, the United Provinces, and the Central Provinces. Indian bred horses are not, however, so good as those imported from Arabia, Persia, and Australia. **Pegu ponies** have long been famous. **Asses** and **mules** are most numerous in the Punjab. The Indian Government breeds mules for use in army transport. They are strong and hardy, and especially useful in hilly districts and rough roads, being more sure-footed than the horse.

200. **Cattle,** *i.e.*, bulls, bullocks, and cows, are everywhere reared and greatly valued. They are almost equally common in every Province, and their number is everywhere found to be roughly proportionate to the population. The Government has of late years paid great attention to the improvement of the breeds of cattle, and their protection from disease, as well as to the provision of fodder. **Sheep** and **goats** also are pretty generally distributed, except in Burma, where they are rare. Sheep are most numerous in Madras, and next in the Punjab. Goats are most numerous in the United Provinces, next in the Punjab and Madras.

201. The **elephant** is used for state display by the Native Princes, and for heavy transport by the Government. In Burma elephants are trained to work in the timber yards and may be seen hauling and stacking the heavy logs. For sagacity the elephant is hardly equalled even by the dog. The **camel,** the most useful of all beasts of burden in a hot and dry climate, is commoner than the horse in Sind, and almost as common in the Punjab and the

North-Western Frontier Province. Camels are used also to some extent in the United Provinces, but in other parts of India they are hardly known. The **buffalo** is common throughout India, and, like the bullock, is used for draught purposes both on the road and in the fields. As in every other country, **dogs** of various breeds are universal. The most notable are the **mastiff** of the Himālayas, and the **polegar hound** of South India.

(9) Economic Animal Products

202. The ordinary animal products which are everywhere used as food, and, as such, are common objects of local production, trade and consumption, need only be mentioned. Such are milk, butter, ghee, eggs, fish, poultry, game, flesh, etc. Flesh, either of beasts or birds, is a less common article of diet in tropical regions than in colder latitudes, and in India a vegetable diet has the added sanction of religion. Of the natives of India few beyond the Muhammadans and the lowest castes of Hindus are habitual flesh eaters. Milk, butter, and ghee, and all forms of dairy produce, are, however, universally used. So also are eggs. Fish, wherever it can be had, is a welcome food to fully two-thirds of the people, and in the deltas of the rivers and along the coasts it forms a staple article of diet.

203. Fish curing is being developed in India as an economic industry, and it is possible that at no very distant date salt fish may become an article of export. Already there is a small quantity exported from Sind. Fish in India is commonly eaten fresh, and until very recently the process of fish curing was hardly known, or was rendered impossible by the prohibitive price of salt. For some years now the curing industry has been fostered by Government on the coasts of Madras and Bombay. Fish curing yards have been opened, and salt for the purpose has been supplied at a nominal figure.

204. There is a considerable production of **wool** in India, though of an inferior quality. Much of it is used locally in the manufacture of carpets, etc., and almost all the rest is exported to Great Britain. The value of the raw wool exported in 1907 was £1,600,000. For the best class of woollen manufacture in India raw wool is imported.

205. Hides of various kinds are a valuable article of commerce. They are collected in every Province both for the local leather industry and for shipment to Germany, Italy, and Austria. The value of the hides exported in 1907 was over £10,000,000. There are also small exports of **horn, bone manure,** and **bristles.**

206. Silk is the produce of the silk-worm, which is cultivated largely in Bengal and Assam, and to a less extent in several other provinces. It lives only on the leaves of the mulberry tree. Of late years great attention has been given to the culture both of the silk-worm and of the mulberry, and the silk industry is increasing. A wild silk is obtained in large quantities in Assam, which is known as **tusser silk.** It is locally manufactured, and silk fabrics are much used by the Assamese. A good deal of the cultivated silk is also manufactured locally. The value of silk exports in 1907 was over £500,000.

207. Lac is deposited by the lac insect, and is collected by the hill tribes in the Central Provinces and Chotā Nāgpur. It is the source of **shellac,** a material used in the manufacture of varnishes and sealing-wax, and of **lac-dye.** The lac insect lives on many kinds of forest trees, and its artificial culture has been attempted by the Forest Officers in the Central Provinces. The lac industry is a remunerative and a growing one, and the exports of lac and lac-dye in 1907 were over £2,300,000 in value.

CHAPTER V

MANUFACTURES, COMMUNICATIONS, AND COMMERCE

(1) Manufactures

208. We have already seen that India is essentially an agricultural country. According to the last Census, out of a total of 138½ million "workers" agriculture claims 88 millions. To these must be added many millions more whose occupations are incidental to agriculture, such as the care of cattle and sheep, the construction and repair of agricultural buildings and implements, and the exercise of the various handicrafts and trades which supply the domestic and economic needs of a simple agricultural people. Directly or indirectly these are all dependent on the soil. The crops are their one ultimate source of wealth, and an unpropitious season brings distress upon them all. Taken together these classes constitute not less than five-sixths of the *workers* of India, and represent a total population of at least 250 millions. There are few, if any, countries in which agriculture takes so predominant a place or bulks so largely in the occupations of the people. Nevertheless, India has a few important manufactures.

209. **Cotton Manufactures.** Cotton spinning and weaving are very ancient industries in India. They go back as far as history will take us. For many centuries the products of the hand-looms of India were greatly prized in the West, and were a valuable Indian export. In its early years the East India Company did a considerable trade in Indian cotton cloths, and established most of its factories near the chief seats of the weaving industry.

But when, less than a couple of centuries ago, Great Britain began to manufacture cottons for herself, the English market for the Indian article was closed, since in order to protect the growing home industry the importation of foreign-made fabrics was prohibited. This greatly reduced the production of the best cottons in India, and especially of the delicate muslins. In 1813 the trading monopoly of the East India Company was abolished, and the Indian trade thrown open to private enterprise. One of the results of this change was that English-made cottons began to compete in India with the local manufacture. By that time power-looms had taken the place of hand-looms in England, but were completely unknown in India. Now hand-woven goods, though usually better in quality, cannot compete in price with the fabrics so swiftly produced by power-looms, and accordingly Indian-made goods gradually gave way before the " piece goods " of Manchester, in which a vast Indian trade grew up. The quantity of English-made cottons sold in India to-day is more than twenty times as great as the entire produce of the English mills 100 years ago. Little wonder that the Manchester manufacturers fought hard, and still fight, for so important a market.

210. But though greatly reduced, the Indian hand-loom industry has by no means been destroyed. It still gives employment to over $2\frac{1}{2}$ millions of weavers, and supports a total population of over $5\frac{1}{2}$ millions. The fabrics produced are chiefly of the commoner and cheaper order, or of kinds especially adapted to Indian tastes, and which Manchester does not copy, or cannot equal. Such are the beautiful **sārīs** and **turbans** of Gujarāt, which are sometimes mixed with silk, or bordered with silk and gold, and the exquisite **muslins** of Dacca, Murshidābād and Arni. Dacca muslin was once famed throughout the world, but now its manufacture is on a very limited scale. Vizagapatam, Nellore, Surat, Ahmadābād, Poona, Dhārwār, and many other places are considerable centres of hand-loom weaving still, and to some degree the manufacture is found in every town and almost in every village.

211. Cotton Mills. During the last half-century India has been regaining a part of her lost cotton manufacture by the adoption of Western machinery and the use of steam power. The first steam cotton mill was opened in Bombay in 1854. Thirty years later there were 74 such mills at work in India, and twenty years later still, *i.e.*, in 1904, their number had increased to 206. These mills represent a total capital of about £12,500,000, and give employment to over 200,000 people. In the last ten years their out-turn has risen from 430,000,000 lbs. of yarns and woven goods to 820,000,000. Bombay is the great centre of the steam cotton industry in India just as Manchester is in England, but there are mills in many other parts of the country. The importation of Manchester piece-goods has not been greatly affected by the establishment of mills in India, for the English fabrics are cheap and good, and meet the needs of the poorer classes. But the growth of the steam industry has given India a valuable export trade in cotton yarns and piece goods, most of the former going to China and the latter to Ceylon and the Straits Settlements.

212. Jute Manufactures. The valuable jute industry of Bengal is quite a recent growth. The plant was hardly known in India fifty years ago. There are now 44 jute mills, almost all in Bengal, which give employment to over 160,000 people. The chief manufactures are **gunny bags** and **gunny cloth.** Gunny bags are used in commerce for the transport of grain and other articles. In 1907 over 250 million bags were shipped from Calcutta to various parts of the world, the largest customers being Australia, Great Britain, Chile, the Straits Settlements, and Egypt. Gunny cloth is a strong and coarse material, also used chiefly for packing. The manufacture of gunny cloth has increased greatly of late years. In 1897 the export was 169 million yards, in 1907 it was 696 million yards. The total value of manufactured jute articles exported in the latter year was nearly 10½ millions sterling.

213. Woollen Manufactures. There are six woollen mills at work in North India which give employment to about 3,500 people. They make **serge** and **blankets,**

chiefly for the Army and Police services. For this purpose they employ a mixture of Australian and Indian wool, the latter alone not being of sufficiently good quality. Far more important are the hand woollen manufactures in which about 180,000 people are engaged. Like all hand manufactures wool weaving is found in almost every district, being represented sometimes by single families of weavers, sometimes by small communities. **Carpets, rugs,** and **rough blankets** are the principal articles made. The best carpets are produced in Kashmīr and Sind, and at Mirzāpur and Agra, and cheaper kinds at Masulipatam and Bangalore. Blankets are made in every Province, and rugs have become a very common jail manufacture. The **Kashmīr shawl,** which used to be so famous, is woven of the soft wool of a Himālayan goat, but its production has greatly declined.

214. Silk Manufactures. The indigenous silk industry of India provides employment for over 200,000 people. Silk fabrics are woven chiefly in Bengal and Assam, where the silk-worm is extensively reared. It is also found wild in the forests of Assam, where the cocoons are collected, and the raw silk woven into the material known as **tusser silk.** Silk mills have been established in Bombay which employ nearly 3,000 people. They produce excellent fabrics, chiefly for the Burma market; silk being a favourite article of costume among the Burmese. About £50,000 worth of manufactured silk is exported annually. **Silk carpets** are made at Tanjore and Salem.

215. Metal-work. Gold, Silver, Brass, Copper and Iron workers are found everywhere. The gold- and silver-smiths of India number over half a million. These metals are employed mainly for ornament, and special types of manufacture prevail at different centres. Trichinopoly is famous for what is known as "swami" jewellery; Cuttack for silver filigree work; Kashmīr for carving on gilded silver; Cutch, Lucknow, and Dacca for hammered silver. Brass and copper workers number over 150,000 and chiefly manufacture culinary and other household utensils. Ornamental carved brass work is produced at many places,

notably at Benares. Most of the brass and copper used in India is imported from England. Ironworkers number over half a million. The iron and steel used in India is mostly imported from England and Belgium. Owing to the great quantity of iron and steel manufactures also imported, which exceeds in value the entire import of the unmanufactured metals, the native industry is declining. This is especially the case as regards cutlery.

216. **Pottery.** This is an important native industry found in almost every considerable village. Vessels of coarse earthenware of almost every kind required for household or industrial use are made by the village potter, but the better class of wares are all imported. In Sind, tastefully ornamented and very finely glazed vessels and tiles are made; but in no part of India has the fine porcelain of China been equalled. **Tile factories,** on a large scale and employing European methods, have been established in most Provinces.

217. **Carved Work.** Carving in wood, ivory, and horn, are also very ancient Indian industries. Amritsar, Benares, Murshidābād and Vizagapatam are all noted for their **ivory work,** much of which is of exquisite delicacy. The chief woods used are sandalwood and ebony. In Gujarāt and Burma much beautiful carving is done for building purposes, especially ornamental panels and pillars. Fine **inlaid work,** in ivory, horn, and metals, on a base of sandalwood or ebony, is also done in many parts. A large quantity of Indian carved and inlaid work is shipped to Europe.

218. Other manufacturing industries are small. **Paper-making** by native methods is carried on to a small degree in most Provinces, and eight paper mills using steam power and European machinery have been established. They supply most of the paper used for Government printing. Twenty-seven **breweries** are also at work, and supply the greater part of the beer consumed in India. Several **sugar factories** and **tanneries** have also been started, chiefly in the United Provinces and Bengal, as well as **steam flour mills** in the wheat districts. But these five industries together

do not employ quite 20,000 people. Other industries, which are sometimes classed as manufactures, are merely the preparation of raw products for export. Such are cotton cleaning, ginning, and pressing, jute pressing, and rice cleaning, which together find employment for over 130,000 workers in about 1,200 mills.

219. Taken as a whole the manufactures of India are exceedingly few and small compared with the size and population of the country. The use of modern machinery and steam power is very restricted, and is not likely to extend with any great rapidity. Two things are against it: (1) the cheapness of labour, and (2) the great cost of setting up steam mills. It is said to cost three times as much to set up a cotton mill in India as in England, owing to the fact that all the machinery has to be imported. Other mills are almost equally costly. So long as this is the case, and hand labour continues to be available and cheap, everything that *can* be done by hand will continue to be so done. The course of industrial development will doubtless change these conditions in India as elsewhere. But the process will be comparatively slow.

(2) Roads

220. Till within the last 75 years there were few good roads in India except in the immediate vicinity of the larger stations. Away from these the only semblance of roads were broad *tracks*, marked sometimes by avenues of trees which the piety of native rulers had planted. Such tracks were seldom even levelled, and, though they served for palanquin bearers or pack animals, they were practically useless for wheeled traffic. The East India Company did not realise the importance, either for military or commercial purposes, of easy means of communication, and were unwilling to face the heavy outlay that the construction of roads must entail. Even so late as 1830 Sir Charles Metcalf declared that *India did not want roads*. But wiser counsels were already prevailing. The grand trunk road

from Calcutta to Delhi, which had for some time been under construction, was completed in 1835, and was carried beyond Delhi to the North-West Frontier at Peshāwar. Other trunk roads soon followed. Bombay was connected with Agra on the one hand, and Madras on the other, by roads which crossed the Western Ghāts at the Thāl and Bōr passes respectively. A few years later Calcutta and Bombay were united by a road crossing the peninsula by way of Nāgpur, and joining the Bombay-Madras road at Poona. Calcutta was also connected with Madras by a road that skirted the east coast and was continued southwards into Tinnevelly. All these roads were metalled and bridged throughout, and the way in which they were carried over mountain barriers was often justly regarded as a triumph of engineering skill.

221. Road-making in India received a great impetus during the Governor-Generalship of Lord Dalhousie, who did more than any other ruler before or since to improve Indian internal communications of every kind. It was during his rule that the **Public Works Department** was organized, and was made responsible for the construction and maintenance of roads suited to heavy-wheeled traffic. From that time the improvement of road communications has been steady and unceasing. Trunk roads have been multiplied, from which branch roads, often of a lighter and less costly make, lead to every considerable town. The principal object kept in view in planning some of the greater roads was undoubtedly the military needs of the Government, provision being thus made for the easy transport of troops and heavy artillery. But the roads became also great arteries of commerce, and so served a far greater and more beneficent end. In course of time the extension of railways in India robbed the roads of their military value, but at the same time greatly increased their commercial importance. They have become the auxiliaries and feeders upon which the railways depend. For the last thirty years the economic, and not the military, needs of the country have determined the construction of roads in all save the Frontier Provinces.

222. For some time after the establishment of the Public Works Department most of the roads were under its care. The extension of local government has changed this, and now the **Local Boards** or other local authorities are responsible for them, and meet the cost of construction and maintenance from local funds. Only a few of the more important roads are maintained by the Provincial authorities, and these are still under the care of the Public Works Department.

223. The total length of roads in British India is now over 200,000 miles. About a quarter of this length is metalled, *i.e.*, composed of hard stone, broken evenly, and well compacted. The metalling of roads in any Province naturally depends upon the ease with which a supply of suitable stone can be had. If this is not available locally, only the more important roads can be metalled, as the cost of bringing stone from any distance is prohibitive. In the great plain of the north there is no supply of stone except in the vicinity of the hills, and therefore out of 100,000 miles of road less than 10,000 miles are metalled. In the Presidency of Madras, on the other hand, out of 24,000 miles of road more than 16,000 miles are metalled.

(3) Railways

224. The first railway constructed in India was a short line from the city of Bombay to Thāna, which was opened in 1853. In that year Lord Dalhousie penned a Minute, which has become historic, on the need of railway construction throughout the land and the duty of Government to encourage and facilitate it. He planned a number of great trunk lines to connect the chief cities and provinces of India, and which he thought might be constructed by private Companies under the safeguard of a Government guarantee of five per cent. interest on the capital expended. As a return for this guarantee the Government would retain the final control of the railways, and so would be able to secure their adaptation not only to the commercial and social needs of the country, but also to possible military

requirements. He believed that with such a guarantee companies would soon be formed to construct and work all the lines which he most desired to see, and he did not believe that the financial risk to the Government would be serious, as the lines would be likely soon to earn the full interest guaranteed.

225. It was on this system that railway construction in India on a large scale was begun. Three great companies were speedily at work, the **East Indian Railway,** with its headquarters at Calcutta, the **Great Indian Peninsula Railway** at Bombay, and the **Madras Railway** at Madras. The first undertook the line from Calcutta to Delhi and the north-west. The second was to connect the western Presidency town with the East Indian line by means of a line crossing the Western Ghāts, and meeting a branch of the East Indian Railway at Jubbulpore. Towards the south another branch of the G.I.P. was planned to cross the Ghāts at the Bōr Pass and run as far as Raichūr, where it would join the northern arm of the Madras Railway. Another arm of the Madras line would cross the peninsula further south, and passing through the Pālghāt Gap unite the East and West Coasts.

226. Such were the bold plans with which railway development in India was begun. Almost at the outset the work was greatly interrupted by the Mutiny, but after peace had been restored construction went on apace. By 1871 over 5,000 miles of guaranteed lines were at work, and Calcutta, Allahābād, Delhi, Bombay, Madras, and Bangalore were thus linked together. Meanwhile, other Companies had been formed. The **Bombay, Baroda & Central Indian ;** the **Sind, Punjab & Delhi ;** the **Eastern Bengal ;** the **Oudh & Rohilkhand ;** and the **South Indian,** were all guaranteed lines, and most of them had achieved a considerable measure of success by the time Lord Mayo became Governor-General.

227. About that time a new system of railway extension was adopted. Lord Mayo saw the need of providing short railways of lighter make to connect the great trunk lines with the chief towns along their routes and with the great

centres of production. This work, he held, could best be done by Government itself. Accordingly, during the next fifteen years a large number of **Indian State Railways** were constructed the cost of which was met by the Indian Government from funds raised chiefly by loans. Several of the more advanced Native States followed this example, and other short lines were constructed at the cost of the Native Governments. Later a third system was adopted in what are now called **Assisted Railways.** These were constructed by private companies, to which the Government guaranteed only a low rate of interest, and as a rule only for a short term of years, but helped them by making them free grants of land as well as other concessions.

228. In the arrangements originally made with both guaranteed and assisted Companies the Government reserved to themselves the right to take the line over after a certain time and under certain conditions. In this way most of the early guaranteed railways have now become State lines, and are worked by the Companies on behalf of the Government. At the close of 1907 there were 30,010 miles of railway open for traffic in India. Of this total 22,355 miles were Indian State lines, and 3,517 miles Native State lines, and the remainder belonged to Guaranteed, Assisted, or Unassisted Companies.

229. The growth of the railway system in India since 1871 has been remarkably rapid. During the three decades between 1871 and 1901 the length of new lines opened for traffic was 4,798, 7,433, and 8,057 miles respectively. So steady and continuous an increase would be remarkable in any country. Equally noteworthy, as showing the increasing utility of the railways and the growing productive power of the country, is the proportionate increase in the traffic over the lines. If we compare the years 1871 and 1907 we find that the traffic per mile of line has increased by 70 per cent. In the former of these years the number of passengers carried for each mile of line open was 5,293, and the quantity of merchandise 1,336 tons: while in 1907 these numbers were respectively 10,196 and 2,069

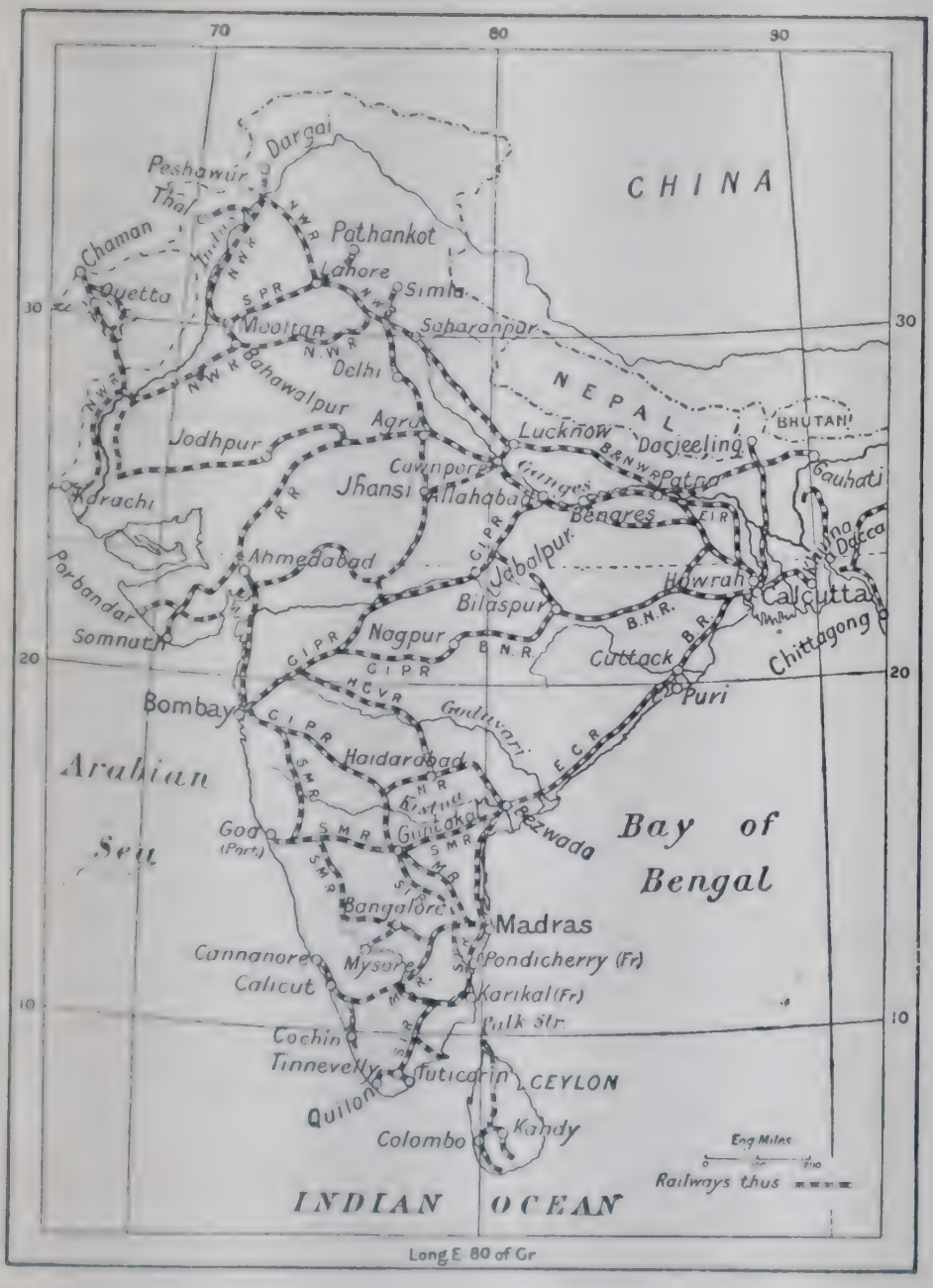


Fig. 37. Showing the chief railways of India.

230. The extent to which railways have benefited India is beyond computation. Not only have they strengthened enormously the administrative and military power of the Government, but, what is of far greater moment, they have developed the resources of the country and so enriched the people. A few lines have been constructed mainly with a view to military requirements. Such are those which put strategic points on the North-West Frontier into direct communication with the centres of Government and with the western ports, Karāchi and Bombay. The great majority of lines have, however, been designed solely for economic ends—to unite the great centres of population, and to give the main areas of production easy and cheap access to the sea. Railways are consequently most numerous in such districts as the densely peopled and productive valley of the Ganges. But whichever of these objects may have led originally to the construction of any line, when once opened it serves both ends. The railways of the North-West have greatly increased the prosperity of the Frontier Provinces, and the numerous lines in the more densely-peopled Districts of the plains have given the Government an administrative grip that it could not otherwise have secured.

231. Financially the railway system of India has been a complete success and has justified Lord Dalhousie's sanguine forecast. The majority of the lines have more than paid their way almost from the first, and for some years railways have not only been no cost whatever to the State, but have made a considerable and growing contribution to the revenue. The total capital expenditure on Indian Railways up to the end of 1907 amounted to £265,600,000, and after interest on this vast sum had been paid the net profit accruing to the Government was over 2½ millions sterling.

232. Nothing is of greater importance to India than a rapid extension of its railway system. It is the only way in which some parts of the country can be effectually protected against famine. A few lines have been constructed especially with this view. Though famine may

be acute in particular districts, there is generally in the country as a whole a sufficiency of grain to supply the entire needs of the people. What is wanted is *a cheap and rapid means of conveyance*. This railways alone will give. Road and canal transit is slow, and the former is costly. Canals, moreover, can only be constructed where the surface of the country is fairly level. No district, therefore, which from its position is liable to severe drought, can be regarded as sufficiently protected till it is opened by railways. And in any district, whether liable to famine or not, railways contribute more to the material welfare of the people than almost any other single cause. They give a ready outlet for their surplus produce, as well as a ready inlet for the commodities that they need; and by tending to equalize prices throughout the entire country contribute to the wealth and wellbeing of the people. The policy of the Government, therefore, is to push on the construction of railways with all possible speed. At the close of 1907 there were 3,300 miles of new lines either in process of construction or sanctioned.

(4) Internal Waterways

233. The great rivers of the north were the most important means of communication before railways were constructed. There were then regular and busy services of steamboats on the **Ganges**, the **Indus**, and the **Brahmaputra**. The through service on the Ganges has been discontinued, and now boats only ply locally in different parts of the river. The Indus service has also been greatly reduced since the opening of the Indus Valley railway, and especially since Karāchi has had a through rail service with the Punjab. Steamers still ply on the **Brahmaputra**, as well as on its tributary the **Bārak**, where they have been less affected by the growth of railway communication. Goods traffic is, however, still common on all three rivers and their main affluents, and some hundreds of thousands of sailing boats are always busy. Especially is this the case on the numerous channels of the Ganges-Brahmaputra delta which are usually crowded with sails. Many of the

larger canals are also navigable, and a few have been constructed especially for that purpose. Such are the **Baliāghāta Canal** from Calcutta to the Sandarbans, and the **Tidal Canal** from the mouth of the Hooghly to Balasore. But the traffic that used to be carried on along some of the irrigation canals has now passed almost entirely to the railways. The **Agra Canal** has been closed to traffic and it has been proposed to close both the **Upper** and **Lower Ganges Canals,** on both of which the traffic has become unremunerative. On the **Western Jumna Canal,** on the other hand, traffic is growing, and is a source of considerable revenue.

234. Peninsular India has few waterways of any great moment. The rivers, being raging torrents at one season of the year and shallow, sluggish streams at another, are not well adapted for the development of boat traffic. Large sums have been spent with a view to establish a **steam service** on the **Godāvari,** but with little result. Traffic in small sailing boats is, however, common on most of the larger rivers. On the South-West Coast a series of **Backwaters,** which have been united by canals, give an almost unbroken stretch of water communication from Cochin to Trivandrum, and form the chief commercial highway of Travancore. Along the east coast the **Buckingham Canal** gives communication between Madras and the Kistna Delta.

235. In Burma, in spite of the construction of railways (which now run northwards from Rangoon for over 800 miles), the Irrawaddy still remains the great highway of the country. Being snow-fed it has an abundant supply of water all through the year, and possesses one of the finest flotillas of river steamers in the world. They ply at all seasons from Rangoon to Bhamo, a distance of 600 miles. There is also a very large amount of other traffic on the river. Neither the **Sittang** nor the **Salwīn** is adapted for through traffic, on account of the rocky rapids that, here and there, bar the way ; but in different parts of both rivers local boat traffic is common. Rafts of teak are floated down the Salwīn.

(5) Foreign Communications

236. With the exception of the Passes which lead across the mountains to the neighbouring States of the north, India's foreign communications are entirely by sea. Before the opening of the **Suez Canal** the principal commercial route between India and Europe was round the Cape of Good Hope. The weekly mails, a considerable part of the passenger traffic, and a small quantity of the more precious merchandise, went by the Red Sea and the Mediterranean, crossing Egypt by rail. But that route was too costly for ordinary trade. Since the opening of the canal the old route *vid* the Cape has been gradually superseded. At present more than three-fourths of the foreign trade of India, both exports and imports, passes through the canal, or practically the whole of the trade with Europe and America. This has led to the rapid development of the two great western ports of India, Bombay and Karāchi. By the Cape route Calcutta was but little further from Europe than Bombay, but by the Canal route Bombay has the advantage by nearly 1,500 miles, and Karāchi by 1,580 miles. Almost the whole of the foreign trade of the Punjab and Sind is carried on *vid* Karāchi; and as Bombay has direct railway communication with all parts of India, much of the trade that used previously to go by Calcutta or Madras now goes by Bombay. Owing to the rapid growth of foreign commerce the Bay of Bengal ports have been able to do more than hold their own, and Calcutta still remains the premier port of India; but for over thirty years Bombay and Karāchi have enjoyed an advantage of position from which they have reaped a rich harvest.

237. The opening of the Suez Canal has had another effect on the trade of India which is worthy of note. It has caused it to be carried almost entirely in steamships. Sailing ships cannot pass the Canal, and even the Red Sea is not safely navigable by large vessels except under steam. No country in the world has so large a proportion of its sea trade carried in steamers as India. In 1906–7 the ships that entered or left Indian ports laden with cargo had a

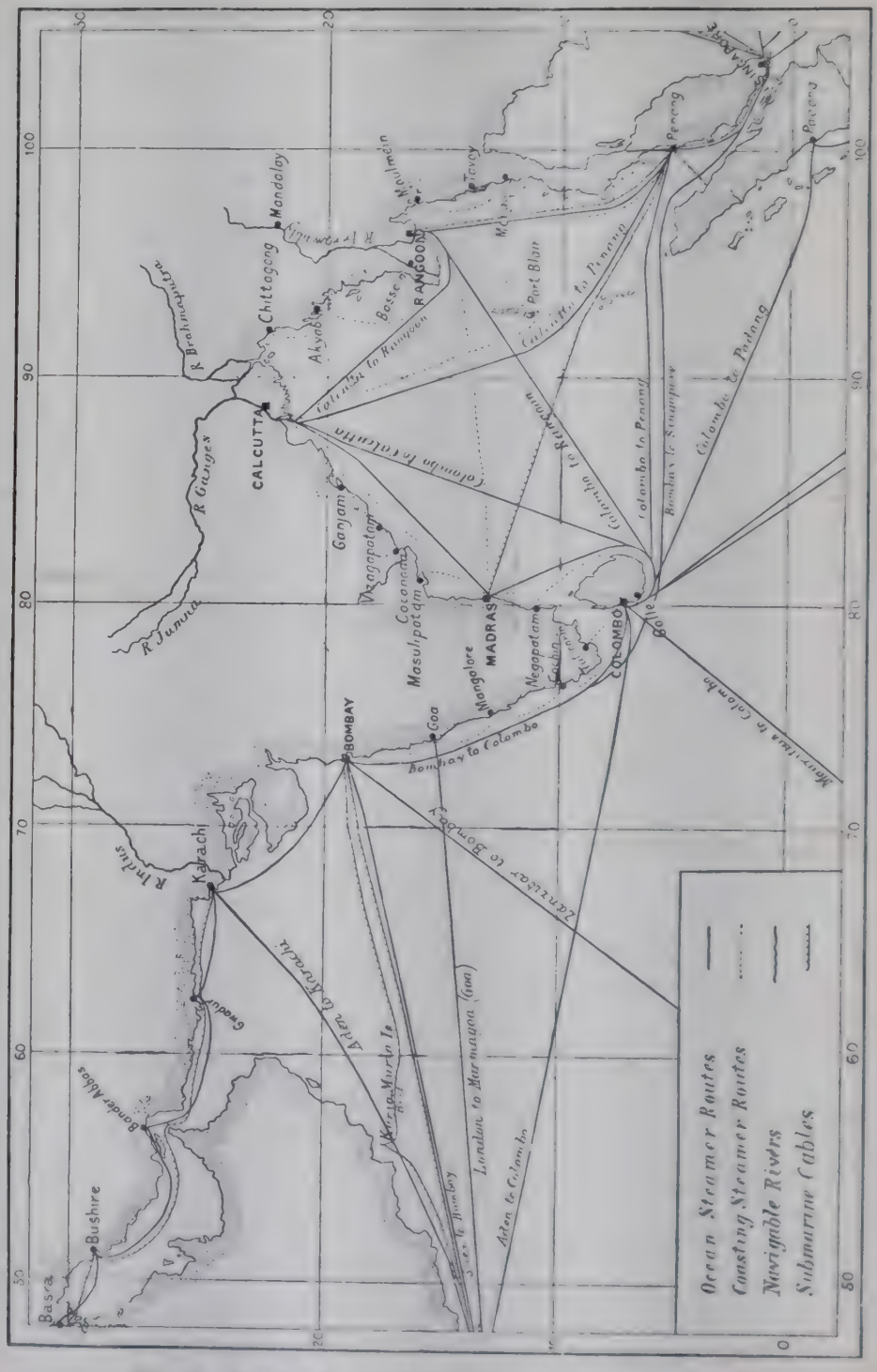


Fig. 38. Showing the chief lines of foreign communication

total tonnage of over 11½ million tons, and of this great total only a little over a quarter of a million tons, or less than a fortieth part, was carried in sailing ships. Though steam-freights are higher than sailing-freights, this is, on the whole, advantageous to Indian trade, chiefly because steamers are more reliable in point of time.

238. There are numerous lines of British steamers running regularly between the various ports of India and London. Most of them touch at one or other of the Mediterranean ports on their way, especially Marseilles, Genoa, Naples, and Brindisi. The **mail route** is *viâ* Bombay and Brindisi and across the continent of Europe by rail. There are also regular steamers from Great Britain to Karāchi direct. Another line has recently been established between Marmagoa and London. There are several less important foreign lines of steamers which give regular communication between India and various European ports, especially Trieste, Naples, Marseilles, and Hamburg.

239. Colombo is the most important steamship junction in Asia. Almost all steamers bound for Calcutta, Rangoon, Singapore, Hong Kong, and the ports of China and Japan, and many of those bound for Australia, call there both on their way out and home. Regular services of coasting steamers are maintained between Rangoon and Calcutta, calling at the smaller Burmese ports, and between Calcutta and Bombay, calling at most of the peninsular ports as well as at Colombo. These steamers bring much of the produce of the coast districts to the larger ports, and at Colombo connect with lines for all parts of the eastern seas. South India is kept in communication with Colombo by the South Indian Railway to Tuticorin, and thence by steamboats which run daily.

(6) Postal and Telegraphic Communications

240. India has the benefit of a postal service which for efficiency and cheapness is second to none in the world. The fixed policy of the Government for many years has been to devote the profits earned by the service to the increase of the facilities given to the public. The rates for

inland postage are exceedingly low. Nowhere else can a closed letter be sent for ½d., or a post card for ¼d. The Value Payable Parcel system (now extended to Ceylon) is a convenience provided in few European States, and is of great assistance in the minor transactions of trade. The other services rendered by the Indian Post Office—the remittance of money, the conveyance of small parcels, the custody at interest of small savings, the purchase of Government securities for depositors, and the provision of a cheap and simple system of life insurance and annuities—are such as are now generally provided by European post offices. In the first of these services, however, the Indian Post Office gives greater facilities to both sender and receiver than are given in any other country.

241. The following figures show the rapid increase during the last 10 years in the various branches of the Indian Postal Service.

	1897.	1907.
Post Offices and Letter Boxes ..	9,948	17,180
Total Staff of the Department ..	50,754	85,873
Letters, Post Cards, Newspapers and Parcels delivered ..	438,778,000	779,556,000
Money Orders issued	10,900,000	21,620,000
Depositors in P.O. Savings Bank	713,320	1,190,220
Balance of Deposits at close of year	Rs. 96,392,000	Rs. 147,670,000

242. The inland telegraphic system of India is now fairly complete, and is worked in connection with the post offices and the railways. There are about 6,500 Telegraph Offices open to the public. Almost every town of over 5,000 inhabitants is served, and the work of connecting up the smaller towns is rapidly proceeding.

243. There are four telegraphic routes to Europe, the two chief being (1) a private company's line *viâ* Suez, and (2) the Indo-European line *viâ* Teheran. The latter is under the control of the Indian Government as far as Teheran, and proceeds by cable from Karāchi to Bushire and thence by a land line north to Teheran, where it joins the European system. There is now also a direct land

connection between Quetta and Teheran by the new Central Persian line constructed under an agreement between the English and Persian Governments. Three submarine cables run from Bombay to Aden, giving direct connection not only with Egypt and Europe, but also, by cables along the east coast of Africa, with the Seychelles, Mauritius and South Africa. Two cables run from Madras to Penang, giving connection with the Straits Settlements, as well as with Australia in the south and China and Japan in the north. There are also land routes to China *vid* Bhamo, and to Siam *vid* Moulmein. Two cables unite Ceylon to India, whence direct cable communication with Australia is under construction.

(7) Internal Trade

244. A detailed account of the internal trade of India cannot be given, as no public record of it is, or could be, kept. The foreign trade, both by land and sea, is recorded at the various Custom Houses where import or export duties are levied upon it. But there are no general inland duties, and therefore no complete inland returns. At one time small duties were levied on certain classes of goods as they passed from place to place, but these have now been abolished. Municipalities occasionally levy octroi duties at the boundaries of their jurisdiction, and then there is a local record of the trade thus taxed. The commerce in a few other articles upon the manufacture and sale of which restrictions are placed, such as intoxicating drinks, salt and opium, is also known. But with these exceptions the internal trade of India goes on unrecorded.

245. But there can be no doubt that in both volume and value it far exceeds the foreign trade. The weight of the sea-borne commerce of India is about 11 million tons a year. But the railways of India alone transport nearly 60 million tons of merchandise a year. From this it is plain that, over and above the collection and distribution of exports and imports, the exclusively internal trade carried on by means of the railways must be at least four times the volume of the entire sea-borne trade. Yet the railways

deal with only a small part of the internal trade, the great bulk of which is carried by road, canal, or river. It is thus of vast proportions, and is of the greatest possible value to the country. The comfort and welfare of the people depend upon it, and the policy of the Government has long been to promote it by every means in its power. Owing to the increasing productiveness of the country as a whole, and the improved means of communication, by which parts once isolated are enabled to bring their surplus products to market, the internal trade of India is becoming greater year by year.

(8) Foreign Sea-borne Trade

246. The foreign commerce of India has been steadily growing for many years. Measured in rupees it has more than trebled in the last 30 years, having risen from a total value of 1,139 million rupees in 1877 to 3,439 millions in 1907. The following are the chief articles of export and import. The figures after each article indicate, in millions of pounds sterling, the value of the quantities imported or exported in the year 1906-7 :—

Exports, (121.5). Raw Cotton, (14.6) ; Twist, Yarn, and Manufactured Cottons, (8.1) ; Raw Jute, (17.9) ; Manufactured Jute, (12.8) ; Rice, (12.3) ; Oil Seeds, (8.6) ; Wheat, (5.2) ; Hides and Skins, raw and dressed, (10.2) ; Opium, (6.2) ; Tea, (6.5) ; Lac, (2.3) ; Raw Wool, (1.6) ; Treasure, (3.8).

Imports, (107.8). Cotton Goods, (27.5) ; Metals, and Manufactures of Metals, chiefly Iron and Steel, (13.3) ; Sugar, (5.8) ; Silk Goods, (1.5) ; Woollen Goods, (1.4) ; Mineral Oils, (1.6) ; Various articles of food and drink, (5.2) ; Treasure, (29.7).

247. Most of the articles of export have been noticed already in the chapter on *Natural Productions*, and little need be said of them here. The exports of cotton, jute, wheat, and tea have been steadily increasing for some years. But the export of **wheat** varies greatly from year

to year. It depends upon the comparative price of the grain in Europe and India, and a very slight variation suffices to increase or diminish the amount shipped. When low prices in Europe coincide with a year of scarcity in India the export is almost suspended. The value of the shipments fell from £6,500,000 in 1898–9 to £20,000 in 1900–1. By 1904 it had risen to nearly £12,000,000, from which high figure it again fell in the following year to less than £6,000,000.

248. It will be noticed that the import of **treasure** (*i.e.*, silver and gold) is much larger than the export, in spite of the fact that India is a gold producing country. This has been the case for centuries. In both ancient and modern times the drainage of the precious metals to India has occasionally given Western rulers great concern, and they have vainly tried to prevent it. Previous to 1835 no exact records were published. In the 74 years that have elapsed since then, however, the returns show that the imports of treasure into India have exceeded the exports by the enormous total of £346,000,000. Much of the silver has been used in the currency and for the manufacture of silver vessels and ornaments, but most of the gold has undoubtedly been hoarded either in the form of jewellery or coin. Now that the Indian Mints are open for the coinage of gold sovereigns it is probable that in time much of this will come into circulation. It is exceedingly desirable that it should, for hoarded wealth is unproductive.

249. The proportion of the foreign trade of India carried on from each of the **chief seaports** is as follows. The values are again given in millions of pounds sterling :— Calcutta, 80.6 ; Bombay, 55.5 ; Karāchi, 16.8 ; Rangoon, 14.1 ; Madras, 9.5. Tuticorin and Chittagong come next with about two millions each.

Each of the great staples of Indian export trade has its special port. Most of the cotton goes from Bombay ; a still larger proportion of the jute from Calcutta ; and almost the whole of the wheat from Karāchi. Rice goes chiefly from Calcutta and Rangoon, and indigo and hides **from Calcutta and Madras.**

250. The following are the chief countries with which the foreign trade of India is carried on. The imports and exports are given separately, and the various articles of commerce are in each case named in the order of importance. Where any article constitutes half the total (of imports or exports, as the case may be) it is printed in heavy type; if it constitutes less than a quarter it is printed in italics. The figures indicate values in millions sterling, and are for the year 1905–6.

UNITED KINGDOM.

IMPORTS from, (48.2). **Cotton manufactures,** *iron, steel, machinery and cutlery, and almost every other article of trade.*

EXPORTS to, (31.2). Jute, raw and manufactured, *tea, wheat, hides, raw wool, oil seeds, rice, raw cotton.*

CHINA AND HONG KONG.

IMPORTS from, (1.0). **Silk, raw and manufactured,** *sugar, drugs, and tea.*

EXPORTS to, (12.6). **Cotton goods,** especially **twist** and **yarn,** opium, *jute manufactures.*

GERMANY.

IMPORTS from, (3.8). Sugar, *woollen goods, metals, cotton goods, hardware.*

EXPORTS to, (13.1). Raw jute, *raw cotton, rice, hides, oil seeds.*

UNITED STATES.

IMPORTS from, (1.7). **Mineral oils,** *cotton goods.*

EXPORTS to, (10.4). **Jute, raw and manufactured,** hides, *lac.*

FRANCE.

IMPORTS from, (0.9). *Wines and spirits, gold thread, silks.*

EXPORTS to, (7.4). Oil seeds, raw jute, *raw cotton, wheat, hides, and coffee.*

JAPAN.

IMPORTS from, (1.0). Silk goods, *cottons, matches.*

EXPORTS to, (4.7). **Raw cotton,** rice.

BELGIUM.

IMPORTS from, (2.9). Steel, *dyes, iron, cotton goods.*

EXPORTS to, (4.8). Raw cotton, oil seeds, *wheat.*

STRAITS SETTLEMENTS.

IMPORTS from, (1.8). Spices, *fish*, *mineral oils*, *tin*.
EXPORTS to, (4.4). Rice, opium, *jute*, *cotton manufactures*.

AUSTRIA-HUNGARY.

IMPORTS from, (2.0). Sugar, *metals*, *glass ware*, *cotton goods*.
EXPORTS to, (4.0). Raw cotton, *jute*, *rice*, *hides*.

CEYLON.

IMPORTS from, (0.5). *Betelnuts*, *coconut oil*, *tea*.
EXPORTS to, (4.2). **Rice**, *cotton manufactures*, *coal*.

ITALY.

IMPORTS from, (0.7). *Cottons*, *silks*, *dyes*, *coral*.
EXPORTS to, (3.8). Raw cotton, *hides*, *jute*, *oil seeds*.

Large quantities of gunny bags and other jute manufactures are also exported to the South American Republics, especially **Argentina** and **Chile**, from whence there is no corresponding import trade. **Australia** also takes almost a million pounds worth of jute manufactures a year, and sells to India horses, wheat, and copper. There is a large import of sugar from the **Mauritius** and **Java**, and rice is exported to both these countries.

(9) Land Frontier Trade

251. The total trade across the land frontiers of India amounted in 1902 to about 9¼ millions sterling, and by 1907 had risen to nearly 12 millions. The trade with **Nepāl** amounts to 3½ millions, that with **Kashmīr** to 2 millions, and with **Afghānistān** to 1¼ millions. Across the Burmese frontier a considerable trade is done with **West China**, **Siam**, and the **Shan States**, which amounted in 1905 to about 2¼ millions. The chief articles of import across the land frontiers are rice, ghee, teak, raw wool, silk, and borax; and the exports are mainly cotton goods, salt, **metals**, and sugar.

Fig. 39. East India House, London, in the seventeenth century. The first headquarters of the East India Company.

CHAPTER VI

THE GOVERNMENT OF INDIA

(1) The Growth of the British Dominion

252. When, on December 31st, 1600, Queen Elizabeth signed the Charter which formed the **East India Company,** the last thought in the minds of its promoters was the acquisition of sovereign powers over Indian territory. Their aim was to secure a share of the trade which for ages had been the greatest prize of sea-faring supremacy, and which at that time was an object of bitter rivalry between the Portuguese and the Dutch. The attention of the Company was at first directed quite as much to Java and the Spice Islands as to India proper. But the power of the Dutch in the Islands, and their bitter hostility to the English Company, soon led the officers of the latter to concentrate their efforts upon the coasts of the Continent. Their first settlement was at **Surat,** on the Gulf of Cambay, where a factory was founded in 1612, and by the middle of the century they had established similar factories at **Masulipatam, Madras, Hooghly,** and other places. In 1661 the island of **Bombay** passed from Portuguese to English hands as part of the dowry of Catherine of Braganza, and in 1688 it was made over by the King to the Company.

253. At all these factories, though some of them were strongly fortified, the aim of the Company was trade, and trade alone. Their Charter did, indeed, permit them to make war upon their enemies, and they maintained both land forces and a considerable fleet of warships. But these were intended mainly for the protection of their commerce against the Dutch, with whom they had

numerous fierce encounters. In India itself, however, their policy was one of peace. With the single exception of one brief period (which, though marked by disaster at the time, led to the foundation of the present metropolis of India) the Board of Directors at home seem never to have dreamed of empire, or of winning for themselves in India the position of an independent political power. Their officers exercised sovereign jurisdiction within the boundaries of their factories, but the Board continually impressed upon them the perils that would attend any open display of power, and exhorted them to remember that they were the servants and representatives of a body of merchants whose sole aim was profitable trade.

254. But during the last half of the eighteenth century an irresistible combination of circumstances completely changed this attitude. For some time the Mughal Empire had been rapidly breaking up. After the death of Aurangzebe in 1707 there was no strong central power in India, and by the middle of the century the great provincial governors, though still owning a nominal allegiance to Delhi, had become practically independent rulers. The **Nawāb of Bengal** held his court at Murshidābād; the **Nawāb-Wazīr of Oudh** ruled over the territories now included in the United Provinces; and the **Nizām-ul-Mulk** held the heart of the Deccan and a long stretch of the east coast. In the west the **Marāthā Confederation** had all power in its hands and oppressed the Rājput princes. The **Peshwā,** the nominal head of the Confederacy, was supreme along the coast of Bombay; the **Rājā of Nāgpur** had pushed his dominion across the peninsula to the coasts of Orissa; while **Sindhia** was pressing his conquests in the north and was soon to wrest from the Afghāns the possession of the imperial city and the person of the fallen Emperor. Such was the condition of India at the middle of the eighteenth century. Amid a multitude of chieftains these were the most powerful and aggressive, and as each was set on the extension of his dominions or the plunder of his neighbour, the suffering country was torn by incessant war.

255. Amid such surroundings it would have been impossible in any case for the officers of the East India Company to have held long aloof from Indian politics. The Directors themselves were beginning to feel that the security of their Indian trade would soon depend upon their ability to seize and wield independent political power, and were accordingly busy strengthening their armed forces. But events moved more quickly than they foresaw. Another set of circumstances, of western origin, suddenly threatened their very existence, and quickly plunged them into the vortex of Indian strife.

256. Like the other sea-faring nations of Europe the French had endeavoured to secure for themselves a share of the Indian trade, and a **French East India Company,** established in 1664, possessed fortified settlements at both Pondicherry and Chandernagore. Commercially the French Company had never been a success, and had been maintained at a heavy cost by the home Government, but in India the French were at least the equals of the English in military power and political influence. When, in 1744, war broke out between England and France in Europe, it precipitated a conflict (that in any case could not have been long delayed) between the two powers in India which, with the exception of a brief interval of peace, lasted for nearly twenty years. In the hostilities that ensued most of the Native Princes of South India and the Deccan were at different periods involved as the allies first of one of the chief combatants and then of the other. The aim of the French commanders was nothing short of the expulsion of the English from India. They hesitated at no intrigue which might assist them to accomplish their purpose, and as the same may be said with equal truth of the English, both parties were soon plunged in the muddy and turbulent sea of Indian politics. At the beginning of the war the fortunes of the British fell exceedingly low. Madras was taken, and the Governor and chief citizens led captive to Pondicherry. But the genius of **Clive** and **Sir Eyre Coote,** coupled with the decline of the French naval power, turned the tide. Lally, the

French General, was finally defeated at **Wandiwāsh** in 1760, and the following year Pondicherry surrendered to the English. The town was restored by the Treaty of Paris in 1763, but the power of the French in India was utterly and permanently broken, and the political ascendancy of the British established on the firmest of all bases, military prestige.

257. While the French and English were contending in the Carnatic the foundations of the British Empire in India were being firmly laid in Bengal. The Governor of Fort William, having been ordered by the Directors to see to his defences lest he should be attacked by the French from Chandernagore, proceeded to strengthen his fortifications. The Nawāb of Murshidābād commanded him to desist, and upon his refusal seized and sacked the city, and the terrible tragedy of the **Black Hole** was enacted. Clive was despatched from Madras to retrieve this disaster, and, after retaking Calcutta, routed the Nawab at **Plassey** in 1757. From that time the rich provinces of **Bengal, Bihār,** and part of **Orissa** were under the military control of the Company and greatly strengthened them in their final struggle with the French, from whom they now wrested, without difficulty, the coast Districts known as the **Northern Circārs,** which had been ceded to the French by the Nizām.

258. Clive left India in 1760, and returned to resume the Government of Bengal in 1765. During his absence one Nawāb had been deposed and another set up; the districts of **Burdwān, Midnapore,** and **Chittagong** had been added to the Company's territories; and the Nawāb-Wazīr of Oudh, who had attacked Bengal in the nominal interests of the Emperor, had been defeated at the battle of **Buxar.** Clive now set himself to reform and consolidate the Company's rule. He received from the Emperor the *diwani*, or fiscal government, of Bengal, as well as a formal grant of the Northern Circārs; and, to the great disappointment of many of the English officers, restored the Nawāb-Wazīr to his throne under a treaty which made him dependent on British protection.

259. From that time, as was clearly seen by Clive and others, British power was potentially supreme in India. But neither Clive nor his successors were anxious to increase their dominions, believing that they would best conserve their power by abstaining from territorial aggrandizement. In this policy they were more than seconded by the Directors at home, who consistently deprecated an aggressive and warlike attitude on the part of their servants. But war seemed the one thing which it was impossible for them to avoid, and, whether they liked it or not, an increase of their territory was the invariable and inevitable result. Successive Governors-General were sent out under stern commands to pursue a policy of peace and to stand aloof from the internecine conflicts of the Native Princes, but one by one they found that obedience to such commands was impossible if the power and influence of the Company were to be maintained. War was the normal condition of most of the Native States, and as the Company had relations with almost all of them its interests were continually threatened, and its forces were consequently engaged in almost incessant hostilities. It was not till **Lord Wellesley's** Governorship (1798–1805) that definite steps were taken to put an end to this state of things by establishing the acknowledged supremacy of the British throughout India, and so making them the arbiters of peace and war. The policy which that far-sighted statesman inaugurated did so much to consolidate British dominion and secure the peace of India that it deserves special attention."

260. In his own words Lord Wellesley's aim was "to preserve the tranquility of India by exercising a general control over the restless spirit of ambition and violence" which characterised almost every Native Government. He sought to do this by a system of **subsidiary treaties** with the Native Princes whereby the English guaranteed to them security and protection on condition that they disbanded the greater part of their forces, resigned the right to levy war or make foreign alliances, and agreed to pay an annual subsidy sufficient to meet the cost of the

troops that the paramount power would maintain for their defence. These subsidiary treaties have done more to give peace and stability to the Native States of India and to determine the map of the country than any other cause. Speaking roughly, the present Feudatory States are those that accepted British protection, and, as a result, exist to-day, while the British Provinces embrace the territories of all such as refused it, together with districts ceded by some of the protected States in lieu of the subsidies they had agreed to pay.

261. The policy thus initiated by Lord Wellesley was steadily followed by his successors till the whole country was brought under control. Every native war, every uprising of the turbulent native soldiery against their chiefs, every failure of a native prince to carry out his treaty obligations or to rule his territory justly, and every act of treachery or hostility against the paramount power, led inevitably and quickly to the assumption of control by the British and the extension and consolidation of their empire. We cannot follow the process in minute detail, but the following paragraphs indicate in brief outline the chief stages in the building up of the British dominion both before and after the time of Wellesley.

262. For nearly half a century after the conquest of Bengal the chief additions to British territory were in the south of the peninsula. In 1761, the year after the French power had been broken at Wandiwāsh, the Nawāb of the Carnatic sought British protection. The same year Haidar Alī, a mercenary soldier in the service of the Mysore Rājā, expelled the Hindu dynasty, and seized Mysore for himself. He soon became the most aggressive and dreaded ruler in South India. His forces continually threatened Travancore, and the Mahārājā sought and obtained British protection. Before the close of the century the British had fought three wars with Haidar Alī or his son Tipū Sultān. At the close of the second of these the **District of Malabar** on the west coast was added to the British dominions. The third war resulted in the death of Tipū, who was slain at the siege of Seringapatam, the restoration of the Hindu dynasty under British protection, the transference of the districts of **Cuddapah,**

Bellāry, and part of **Kurnūl** to the Nizām, and the acquisition of **South Kanara** and **Coimbatore** by the British. At the same time the small Marāthā Kingdom of **Tanjore** was handed over to the British. The following year the Nizām entered into a subsidiary alliance, and in lieu of a subsidy ceded the districts he had received at the partition of Mysore. In 1801 the whole of the territories of the Nawāb of the Carnatic, which had long been under British administration, were formally annexed. These various and extensive territories, acquired within the space of three years, together with the Northern Circārs (taken from the French in 1759) were consolidated into the **Province** (or **Presidency**) **of Madras,** the boundaries of which a hundred years ago were very nearly what they are to-day.

263. The first twenty years of the nineteenth century witnessed the consolidation of British authority over almost the whole of north India south of the Sutlej and east of the Thar, or Indian Desert. The **Kingdom of Oudh** had, as we have seen, been practically under British protection since Clive's days. The Nawāb-Wazīr was, however, threatened by the Marāthās all along his frontier, his army was mutinous, and his finances were disorganised. He was therefore very ready to fall in with Lord Wellesley's policy, with whom he entered into a subsidiary alliance, ceding to the British the whole of his frontier provinces in the south and west. His kingdom was thus greatly reduced in size, but being flanked by British provinces on three sides it was secured from attack and continued to exist as a Protected State till 1856, when it was forfeited to the British through misgovernment.

264. The annexation of the frontier provinces of Oudh brought the British into close touch with the most turbulent of the Marāthā princes, and to Lord Wellesley the time seemed ripe for such an assertion of British supremacy as would curb their lawlessness. The Marāthā confederacy was torn by civil war, and the Peshwā, its nominal head, had fled before his more powerful chiefs. He appealed to the British for help, signed a subsidiary treaty and was restored to his throne at Poona to be henceforth under British protection and control. Such a treaty Sindhia and the Rājā of Nāgpur, the most powerful Marāthā chiefs, scornfully refused to recognise, and British forces were sent against them. The war which ensued led to a great increase of British power in central and northern India, as well as to large

accessions of territory. The Rājā of Nāgpur was compelled to cede the coast district of **Cuttack** to the British, and to restore **Berār** to the Nizām; while from Sindhia Lord Wellesley took the coast districts north of Bombay, and an extensive and fertile tract along the Jumna, most of which is now included in the Province of Agra. **Delhi,** and with it the person of the Mughal Emperor, thus passed into British hands.

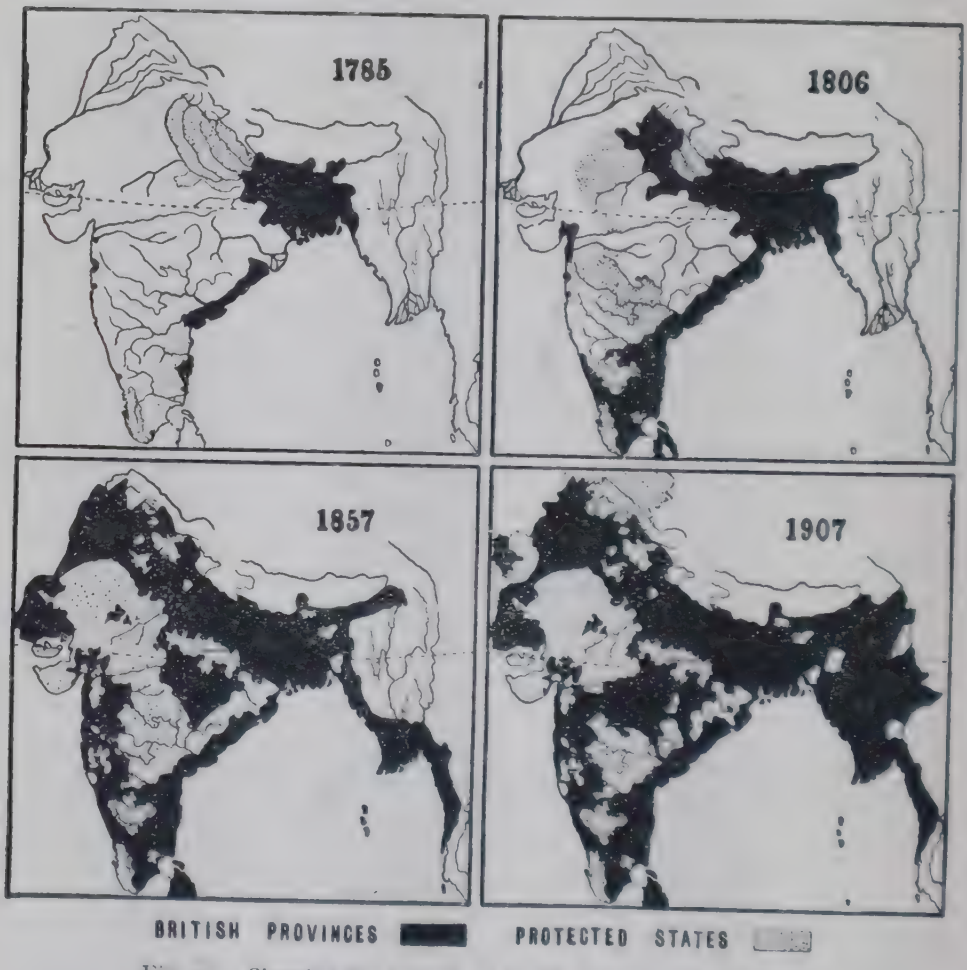


Fig. 40. Showing the growth of the British Empire of India.

265. The British now held the whole of the east coast of the peninsula from Chittagong to Cape Comorin, and the greater part of the west coast also. In the whole of south India and in the greater part of the Deccan their supremacy was acknowledged, and the country was rapidly settling down to reap the

blessings of peace. But in the north the sturdy and independent Marāthā chiefs still struggled for mastery. In 1817, when the English troops were engaged in a war with the Pindārī free-booters, the Peshwā thought the moment was opportune for him to throw off the British yoke, and the Rājā of Nāgpur declared in his favour. The war which followed broke the Marāthā power. At its close the **territories of the Peshwā** were incorporated in the Bombay Presidency, and the **Narbadā** and **Saugor districts** which now form the west and north of the Central Provinces, were taken from the Rājā of Nāgpur. All the Marāthā chiefs now formally bowed to the British supremacy, as did also the Rājput Princes, who welcomed their deliverance from Marāthā oppression.

266. British power was now supreme throughout the whole of India save Sind and the Punjab. After the war with Nepāl in 1816 a large tract of hilly country to the north of Rohilkhand had been taken from the Gurkhas, and between the rivers Jumna and Sarda the British frontier had been pushed northward to the summit of the Himālayas. **Sind** was conquered in 1843, and the western frontier was thenceforward in touch with Baluchistān. In the Punjab the Sikhs had firmly established their power, and for nearly half a century had held the country against all comers. While successive Governors-General were engaged in the reduction of Tipū and the Marāthās the Sikh power had been of the greatest service as it effectually closed India against all marauders from across the northern frontier. Ranjīt Singh had ruled the country with a strong hand, and had loyally observed his treaty with the British by which the Sutlej was made his southern frontier. After his death in 1839 internal disorders broke out, and in 1845 the Sikh army crossed the Sutlej and invaded British territory. The First Sikh War followed, at the close of which the Punjab came under British protection. Two years later an insurrection among the Sikh soldiery led to the Second Sikh War, which resulted in the **annexation of the Punjab** in 1849. British territory now stretched up to the natural north-west frontier of the country. Since then British influence has been pushed beyond the frontier proper, and many warlike tribes have been brought under partial control. But every such forward movement has been made mainly with the object of strengthening the frontier and making it impregnable to attack from without.

267. While, through the force of irresistible circumstances, British rule has thus spread throughout India, from the southern seas to the Himālayas, in the east it has passed the natural boundaries of India proper. No barrier State protected Bengal from foreign attack, and the depredations of the Burmese on the north-east frontier led to the First Burmese War in 1825, which resulted in the annexation of **Assam, Arakan** and **Tenasserim.** The entire eastern shores of the Bay of Bengal thus came under British control. The Second Burmese War in 1852 led to the annexation of Pegu. In 1886 King Thebaw, whose cruelty and misrule had long called for chastisement, was deposed and banished, and the whole of his dominions annexed. Thus was completed the **Province of Burma,** the latest, the largest, and in some ways the most progressive, of all the Provinces of the Empire of India.

(2) Government and Administration

268. As its territories increased the East India Company gradually ceased to be a trading association and became an administrative and political corporation under the authority of the British Parliament. Up to 1773 Parliament claimed no direct authority over the Company's affairs. The Governors of Fort William, Fort St. George, and Bombay were responsible only to the Board of Directors, and each of them was independent of the others. But when the acquisition of the great Province of Bengal made the Company responsible for the government of a vast population, Parliament asserted its right of control, and in 1773 the **Regulating Act** was passed. This Act gave to the Governor of Fort William (who by that time had come to be called Governor of Bengal) the title of **Governor-General,** and empowered him to exercise a measure of control over the other two Governors in all matters relating to peace or war, or political alliances with the Native States. The same Act established a **Supreme Court** at Calcutta. By **Pitt's India Act** in 1784 a **Board of Control** was constituted, which was made superior to the Board of Directors in all matters of Indian administra-

tion. At the renewal of the Company's Charter in 1813 its trading monopoly was restricted to commerce with China and the trade in tea, and twenty years later it ceased to be a trading corporation altogether. After the Sepoy Mutiny in 1857 the East India Company was dissolved and the Government of India passed to the Crown, the supreme authority being vested in a **Secretary of State** assisted by a **Council.** In 1861 the **India Councils Act** was passed, and this Act, with certain additions and modifications made in subsequent years, especially in 1892, still prescribes and regulates the various Governments in India.

269. By these and other less important Acts the entire government of the Indian Empire is vested in the Crown and Parliament of the United Kingdom, the King being, by the **Royal Titles Act** of 1876, EMPEROR OF INDIA. The authority of all the high Officers of State in India is derived directly from the Crown, and they carry on the government in the Emperor's name and subject to the control of Parliament. The revenues of the Empire are also collected in his name, but they are spent exclusively for the purposes of the Indian Government.

270. The **Secretary of State for India** is a member of the Government of the United Kingdom for the time being, and like all the other principal Secretaries of State he has, by unbroken custom, a seat in the Cabinet. He possesses all the powers exercised by the Board of Control, as well as those exercised by the Company after 1833, and is assisted by a Council of at least ten members, nine of whom must have spent not less than ten years in India. The Members of the India Council do not, however, like the Secretary for India himself, go out of office with the Government. They are each appointed for a period of ten years, and may afterwards be appointed for a further period of five years, and once appointed they can only be removed upon an address from both Houses of Parliament. Vacancies in the India Council are filled up by the Secretary of State for India for the time being. The Council exercises a general supervision over every branch of Indian adminis-

tration, and has *absolute control* of the expenditure of the Indian revenue, on which the vote of a majority of the members is final. But in all purely political matters the Secretary of State for India acts alone.

271. The supreme government in India is vested in the **Governor-General** (commonly called the **Viceroy**), who is appointed by the Crown, and ordinarily holds the office for five years. He is assisted by a **Council** of seven members appointed by the Crown, with the Commander-in-Chief who sits as an extraordinary member. Three of the members must have been in the service of the Indian Government for at least ten years, another is always a distinguished lawyer, and one is now a native of India. This Council is executive only. **"The Governor-General-in-Council"** is responsible for the entire administration of the Empire, and exercises a large measure of control over all the Provincial Governments. For legislative purposes the Executive Council is enlarged by the appointment of sixteen additional members, and is then called the **Legislative Council** of the Government of India. Of these additional members ten are non-official. All the members are appointed by the Viceroy, but four are nominated by the non-official members of the Provincial Legislative Councils, one by the Calcutta Chamber of Commerce, and the remaining five are selected so as to secure "the due representation of the different classes of the community."

272. The functions of the Council when thus enlarged are purely legislative. Although the Budget Statement is made publicly in the enlarged council, and the financial policy of the Government may then be freely discussed and criticised, the Legislative Council has no authority over any matter pertaining to administration. In legislative matters it cannot repeal or modify any Act of the Imperial Parliament which prescribes the constitution of the Indian Empire or its relation to the Crown, and a few other subjects are also reserved. But with these exceptions the Council exercises full legislative power over the whole of India. Its Acts require the assent of the Viceroy, and may be disallowed by the Crown.

273. The **Provincial Governments** are of several orders. The older Provinces of Madras and Bombay have each a **Governor** with an **Executive Council.** Like the Governor-General the Governors of Madras and Bombay are usually English statesmen, and both they and the members of their Councils are appointed by the Crown. In both these Provinces the Executive Council is enlarged for legislative purposes by the appointment of additional members, and the functions of the enlarged councils are, within their restricted area, similar to those of the Legislative Council of India.

274. **Bengal,** the **United Provinces of Agra and Oudh,** the **Punjab, Eastern Bengal and Assam,** and **Burma** have each a **Lieutenant-Governor,** who is appointed by the Viceroy with the approbation of the Crown. Every Lieutenant-Governor must have served in India for ten years prior to his appointment. Lieutenant-Governors have no Executive Councils, but each Province has its **Legislative Council** in which the Lieutenant-Governor presides. The various provincial Legislative Councils deal only with local questions, and in no way diminish the power of the Governor-General's Council to legislate for the whole of India. A considerable number of subjects are specifically withdrawn from their purview, nor can they repeal or amend any law in force in India prior to 1861. Their Acts require the assent of the Governor-General.

275. The **Central Provinces,** the **North-Western Frontier Province,** and **British Baluchistān** are each under a **Chief Commissioner,** as also are the smaller charges, Ajmer-Merwara, Coorg, and the Andaman Inlands. Chief Commissioners are appointed by the Governor-General on his sole authority. They differ from Lieutenant-Governors chiefly in their *status*, the appointment of the latter having been provided for by a special Act of Parliament. They exercise the same authority in their Provinces, and the entire executive government centres in them. No Chief-Commissioner has a Council. For legislative purposes all the Chief-Commissionerships fall directly under the **Legislative Council of India.**

276. All the large provinces of India, whether ruled by a Governor, a Lieutenant-Governor, or a Chief Commissioner, are divided into **Districts.** The District is throughout India the unit of administrative organisation. With the exception of Madras, the larger Provinces are broken up into **Divisions** containing four or five Districts over which a **Commissioner** presides. In the older Provinces, Bengal, Madras, Bombay (exclusive of Sind), and Agra,—which are known as "Regulation Provinces" from the fact that the early enactments of the Presidency Councils according to which their government was conducted were called "Regulations,"—the chief District Officer is called the **Collector,** while in the Non-regulation Provinces he is styled the **Deputy Commissioner.** But whatever may be their official title, their duties are similar, and include both revenue and magisterial functions. The powers and responsibilities of a District officer are very great. "Police, jails, education, municipalities, roads, sanitation, dispensaries, the local taxation, and the imperial revenues of his district, are to him matters of daily concern."* "If the District officer is weak and incapable, authority and law in the district are weak also; if he is strong and competent, they are respected."† The Collector has under him a large body of Government officers belonging to various branches of the service, not only Assistant and Deputy Collectors and minor revenue officials who take charge of revenue subdivisions, but also officers of the Public Works, Police, Forest, and other Departments of Government, all of whom are more or less completely under his authority and look to him for guidance.

277. During the last quarter of a century an immense development has taken place in **Local Government** of a partially elective character both in towns and rural tracts. Prior to 1881 many attempts had been made in different parts of India to promote municipal self-government, and numerous Acts had been passed by the various Provincial

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* Hunter. † Sir John Strachey.

legislatures with this end in view. But no great progress was made till the Governor-Generalship of Lord Ripon, who took a deep interest in the subject. His Government, actively seconded by the Provincial Governments, took steps to promote the formation both of **Municipalities** and **Local Boards,** which have had, on the whole, the happiest results. There are now nearly 800 Municipalities in India, and the rural districts are almost entirely mapped out under Local Boards. The Municipal Councils, or Committees, and the Boards for the larger rural areas, are almost everywhere **mainly elective,** and though subject to a certain amount of official control, they nevertheless secure to the people a large share in the management of their local affairs. In Madras, where the rural system is more fully developed than in any other Province, there are three orders of Local Boards,—(1) **Village Unions,** or Panchāyats; (2) **Tāluk Boards;** and (3) **District Boards.** The District Boards have a general control throughout the District, and are mainly composed of members elected by and from the Tāluk Boards.

278. The duties that devolve upon these local bodies are very varied. The Municipal Committees (or Councils) have control of the streets, drainage and sanitation, water supply, lighting, precautions against fire, hospitals and vaccination, elementary education, and many other matters that bear upon the corporate life of the citizens and the convenience and beauty of their town. The rural Boards are concerned mainly with roads and other communications, minor public works, dispensaries, vaccination, rest-houses, etc. The total expenditure controlled by local bodies in 1904–5 was over £9,000,000. Municipal revenues are derived mainly from taxes levied on houses, lands, vehicles, trades and professions, and in some Provinces, particularly Bombay, from octroi duties. The revenues of Local Boards consist chiefly of the land cess—a fixed percentage of the land revenue—together with the produce of tolls and ferries and other minor sources of income. To these is now frequently added a contribution from **Imperial revenues.**

279. The **Judicial Administration** of British India differs considerably in different Provinces. Each of the older, or "Regulation" Provinces, Bengal, Madras, Bombay, and Agra, has a **High Court** (established by the Crown in virtue of the Indian High Courts Act of 1861) which supervises and controls the whole administration of justice in the Province. Next in rank are the **District** and **Sessions Courts,** which are established in almost every District and are presided over by a Civil and Sessions Judge who is a member of the Indian Civil Service. All these courts have both civil and criminal jurisdiction. Of the inferior courts the **Magistrates' Courts,** of various classes, have criminal jurisdiction only, all civil suits being tried in the **Subordinate Judges' Courts** and the **Munsiff's Courts**, both of which are civil courts only. In the more recently organised Provinces other systems prevail which differ from this chiefly in the constitution of the superior courts. The Punjab and Lower Burma have each a **Chief Court,** established by the authority of the Indian Government, which exercises all the powers of the High Courts in the older provinces. In the Central Provinces, Oudh, Sind, and Upper Burma, the supreme judicial functions are exercised by one or more **Judicial Commissioners.**

280. The foregoing paragraphs refer only to British India. The **Native States** are administered by their own Governments, subject to a certain measure of Imperial control. There are altogether nearly 700 Native States in India, but many of them are very small. Most of the larger States are directly under the Viceroy, who is represented by a **Resident** at the Native Court, or by an "**Agent to the Governor-General,**" who is made responsible for a group of States. The chief "Agencies" are Rājputāna and Central India. The Chief Commissioners of British Baluchistān and the North-Western Frontier Province are respectively Agents to the Governor-General for the Baluchistān States and the tribal territories of the north-west. The smaller Native States which are within, or contiguous to, a British Province are commonly under the control of its Governor or Chief Commissioner. This is

sometimes the case even with large States. Travancore is, for example, under Madras, and its Resident reports to the Governor of that Province. Many of the Native States are excellently governed, and are developing *pari passu* with neighbouring British Provinces. When that is the case there is no interference on the part of the paramount power, and the Resident's or Agent's duties are confined to the pleasant ones of counsel, co-operation, and report. Bad government or financial improvidence, however, sometimes render interference unavoidable, and then the Government of India takes whatever action seems needful.

(3) The Revenues of India

281. The **total revenue** of British India for 1906–7 was about 73 millions sterling. Of this amount slightly over 23 millions was raised by taxation and the rest was derived from various other sources. The revenue of the United Kingdom for the same year was 142½ millions sterling, of which 119 millions was raised by taxation. The amount of imperial taxation per head of the population was thus £2 16s. 8d. in the United Kingdom, but only 2s. 2½d. in India. The people of India are more lightly taxed than any other people in the world who enjoy the benefit of a civilized Government strong enough to secure to them the inestimable boons of justice, protection, and peace.

282. The **chief taxes** by which the Indian revenue is raised are, in the order of their value, the Salt tax, Excise, Customs, Stamps, Provincial Rates, Assessments, and Registration. The revenue from sources other than taxation is derived from the Land, Opium, the Post and Telegraph services, Railways, Irrigation and other productive public works, Forests, Tributes, the Mint, and the ordinary receipts of the various civil and military departments. Some of these require special notice.

283. The Salt Tax. This tax is one which the British rulers inherited from their predecessors, and it is practically the only tax which touches the whole population. As salt is a necessary of life the policy of the Government is to keep the tax as low as possible. Of recent years it has been reduced from Rs. 2½ per

maund (80 lbs.) first to Rs. 2, and then (in 1905) to Rs. 1½. In 1904–5, when the rate was Rs. 2, the tax yielded over 5 million pounds sterling. The incidence per head of the population is now a little under 5d. per annum.

284. Excise Duties are levied chiefly on alcoholic liquors, Indian hemp (bhang) and opium. The tax is collected in two ways—(1) as a *duty* paid by the manufacturer according to the quantity made, and (2) as a *fee* charged *for licenses to sell*. The amount received under the head of excise has largely increased of recent years, owing partly to increased vigilance in administration by which illicit manufacture and sale have been greatly reduced, and partly to increased consumption.

285. Customs. An **import duty** at the rate of 5 per cent. on their value is now levied on almost all articles of commerce entering India from abroad. On a few articles, such as alcohol, opium, etc., a much higher rate is charged. Cotton piece goods and iron are taxed at a lower rate than 5 per cent.: and cotton yarns, machinery, food grains, and printed books, are admitted free. For twelve years, from 1882 to 1894 India had no general tariff, import duties being levied only on those articles which are now taxed at the higher rates. The financial difficulties caused by the steady decline in the value of the rupee, led to the reimposition of a **general tariff** in the latter of those years. That this has not materially interfered with the growth of foreign trade is sufficiently shown by the fact that the value of imports into India increased four times as rapidly in the decade following 1894 as in that preceding it.

286. Till about forty years ago **export duties** were numerous, but they have been gradually abolished, and now the only article of importance taxed on leaving the shores of India is rice, the export of which is checked by a duty of 3 As. a maund.

287. The other taxes contributing to the revenue are of smaller moment. **Stamps** and **Registration** are chiefly Court fees and duties on legal documents, and may therefore properly be regarded as payments for services rendered by the State. The chief item under Assessed taxes is the **Income Tax** which is levied on non-agricultural incomes of not less than Rs. 1,000 a year. Stamps and Registration yield over 4 millions a year, and Assessed taxes about 1¼ millions.

288. The Land Revenue. The land is by far the most important source of revenue in India. The Land *Tax*, as it is

commonly called, is not a *tax* at all in any proper sense of that word, but (as J. S. Mill and others pointed out long ago) is in reality a *rent* paid for the possession and use of the land. The *State* in India takes the place of the *Landlord* in Europe. From time immemorial the land has been regarded as belonging to the Ruler for the time being. All subordinate rights in it have been derived from him and have been held in virtue of an annual payment of a definite proportion of the produce. The British inherited this system from their predecessors, but they take a far smaller share of the produce. According to all competent authorities the land revenue of Aurangzebe was about twice the amount of the land revenue of the Indian Government to-day, although the cultivated area has greatly increased. The revenue, moreover, is collected to-day with a moderation unknown in earlier times. As the share of the Government is theoretically a share of the *produce*, the tax is partially or wholly remitted whenever any untoward circumstances, such as drought or flood, damage or destroy the crops.

289. Two systems of land assessment are in force in India, known respectively as the **Zamīndāri** and the **Ryotwāri** systems. In the former the revenue is assessed on an individual (or sometimes a community) holding an extensive area which is broken up into small allotments and let out on a rental to the actual cultivators. The Zamīndārs are in most respects similar to the landlords of the west, and they pay the assessed land tax from the rents which they receive. The tenants are of two orders, *occupancy tenants*, who have an inalienable right to the land so long as they pay their rents, and *tenants at will*, who may be evicted at any time. Under the **Ryotwāri** system, on the other hand, the Ryot, or small cultivator, holds his land direct from Government. The tax is assessed upon him, and so long as he pays it he holds his land by a fixed and settled tenure. He can sell or mortgage it without the consent of the Government, and at his death it passes to his heirs. He is thus to all intents and purposes a **tenant proprietor**. The Zamīndāri system was at first favoured by the British Government, and a deliberate effort was made in some of the northern Provinces to create a class of "landed gentry" in India. **Zamīndāri** tenures prevail in Bengal, the Central Provinces, the Northern Circārs, the United Provinces, and the Punjab; while the **Ryotwāri** system is the rule in the greater part of Madras, Bombay, Assam and Burma.

290. The share of the produce payable to the Government is not determined annually, nor is it, except in Bengal, settled in perpetuity. The former was the system of the Native Governments that preceded the British, and was for some time followed by the officers of the East India Company. It was found to be beset by so many difficulties, however, that in 1793 the assessment was declared to be fixed for all time in all the provinces then held by the British, viz., Bengal, and parts of Assam, Madras, and the United Provinces. This is known as the **Permanent Settlement.** In most of the territories acquired since 1793 the assessment is settled once in thirty years. At each settlement everything affecting the value of the land is taken into account, and the amount payable annually for the next thirty years is fixed. The Famine Commission of 1881 found that the incidence of the land revenue varied in different districts from 4 to 8 per cent. of the gross produce of the land, a proportion which is less than one-third of that taken by the Mughal Emperors, and very much less than that paid in the West as rent.

291. Most of the other branches of revenue have been dealt with in another connection and need only be mentioned here. The revenue from **opium** comes in part from the profits made on the opium grown for the Government, and in part from the tax levied on Mālwā opium on its transit through British territory. The large revenues accruing from **Railways, Irrigation,** and other paying public works, the **Post** and **Telegraph** services and the **Forests,** are more than sufficient to pay the cost of these departments. Not one of them is any burden to the State. They contribute enormously to the well-being of the people, and at the same time earn a net revenue which helps to keep taxation down.

(4) Public Expenditure

292. The **total expenditure** of the Government of India for 1906–7 was a little over 71½ millions sterling. If we subtract from this total the expenditure on railways, irrigation works, and other "paying" departments, the remainder is about 49 millions. This in round figures is the present cost of the government and defence of the Empire. Of this sum 7 millions are absorbed by the cost of collecting the revenue, 2 millions by interest on

debt, and 1 million by famine insurance. The civil administration of the country costs 17½ millions, and its military defence 21½ millions.

293. The entire **public debt** of India is about 254 millions sterling, and the interest paid annually on this sum is over 8¼ millions. The greater part of this debt, however, has been incurred on account of railways, irrigation, and other paying public works, the revenue from which not only pays the interest on capital but leaves a considerable margin of profit to the Government.

294. The annual charge on account of **famine insurance** is an attempt to spread over a series of years the heavy burdens that fall upon the Government in seasons of drought and scarcity. India has always been subject to famine, and certain parts of the country must remain so till they are so opened up by railways that in years when their local crops fail they can readily obtain a supply of grain from distant Provinces. In former times famines in India were more frequent and widespread, and immensely more destructive of life than they are to-day. The Native Governments made no attempt to cope with them, and, indeed, it would have been impossible for them to do anything effective owing to the almost complete absence of means of communication. Irrigation has of late years considerably reduced the area liable to famine, and the construction of roads and railways has made relief possible. The Indian Government have now a well-defined code of relief operations, and no sufferer is allowed to die who can possibly be kept alive. This entails from time to time a very heavy expenditure. The famine of 1897 cost the Government nearly 5 millions sterling, and that of 1900 over 6 millions. Shortly after the famine of 1877–8 it was resolved so to adjust income and expenditure as to secure an annual sum of a million sterling as a famine insurance fund. This sum is used to prevent or reduce debt, or is spent on preventive public works.

295. The expenditure under the head of **Civil Administration** covers the whole cost of the various departments of

Indian civil government, both in India and in England. The largest items are the administration of justice and police, which together absorb more than 6 millions. Education and general administration cost $1\frac{1}{2}$ millions each, and the medical, political, marine, and other minor departments about 3 millions. Pensions (chiefly paid in India) take over 3 millions.

296. The Army is the heaviest charge upon the revenues of the country. The total cost includes the whole expenditure both in India and in England for the maintenance of the army in an efficient condition, including transport, defence works, and pensions. Though a part of a greater Empire, India is now practically one of the Great Powers of the world, and like all the rest she feels the burden of growing armaments. But with the vast territories of India to defend, no Government could greatly reduce the amount now spent on defence. The cost of her army is the price India pays for the unspeakable blessings of peace and security, and considering her great extent and immense population it is, in comparison with the military expenditure of other countries, not an excessive price.

297. The size of the army in India is not, as armies now go, by any means a large one. But for the facts that the natural defences by land are unusually strong, and that Great Britain has command of the seas, it would have to be very much larger in order effectually to secure the country in peace. At present it consists, all told, of about 300,000 men. Of these 75,000 British, and 150,000 Native troops constitute the regular standing army. The remainder is composed of Reserves, Volunteers, and Imperial Service troops, the last being a force of 17,500 men maintained by the Native Princes for purposes of Imperial defence. Till recently the Indian army was divided into three commands, the Madras and Bombay Commanders-in-Chief having a large amount of independent control. These chief commands have now been abolished, and the Madras and Bombay armies made subordinate commands under the Commander-in-Chief of India.

(5) The Currency

298. Till 1835 the coins in common use in India were very various. Not only had many of the Native States a special currency of their own (as, indeed, some of them have still), but the rupees coined by the British Government in the different Provinces of India were not identical in value. In that year a standard rupee was introduced for the whole of British India. It was originally equivalent in value to the tenth part of an English sovereign, a value which it retained with but little variation for nearly forty years. Till 1898 this rupee was the only legal tender in British India (*i.e.*, it was the only coin which could be tendered in any quantity in payment of a debt, and which no one could refuse to accept) and being current throughout India it largely took the place of the local coinage in many of the Native States.

299. But about 1873, owing to changes in Europe, silver, and with it the rupee, began to decline in value in comparison with gold. This went on for over 20 years till in 1894 the rupee was worth only the eighteenth part of a sovereign instead of the tenth. This decline was prejudicial to India in many ways, but chiefly because it handicapped foreign trade and at the same time was a source of heavy loss to the Government. How it produced the former of these effects is not difficult to understand. No Indian merchant ordering a cargo of goods from Europe, or shipping a cargo to Europe, at prices fixed in gold, could tell with any certainty how many rupees he might have to pay or to receive, for the gold-value of the rupee might change considerably between the acceptance of the order and the settlement of the account. If, on the other hand, the price was fixed in rupees, a similar uncertainty would beset the merchant in Europe with whom he was dealing. Thus trade was made more or less speculative and uncertain.

300. The loss to the Government of India was simpler and more direct. India has been greatly benefited by the foreign capital that has been invested in her railways and

other productive public works. But the interest on this capital has to be paid in gold. Part of the cost of the army in India, and of the civil service, has also to be paid in gold in England. As the rupee fell in value a proportionately larger number of rupees was required to meet these liabilities, and as the revenues of India were collected in rupees this steady increase in expenditure was met by no corresponding increase in revenue, and soon became a most serious drain upon the exchequer. The "loss by exchange" in 1894–5 amounted to the enormous total of 58 millions of rupees.

301. In 1893 and 1898 Acts were passed to remedy this evil. In the former of these years the Indian mints were closed to the public for the coinage of silver. So long as the Government undertook to coin into rupees as much silver as the public chose to send to the mint, it is plain that the exchange value of the rupee could never very greatly exceed the intrinsic value of the silver that it contained. To close the mints to the public was thus the first step in the reform. Five years later the English sovereign was made legal tender in India at the rate of fifteen rupees to the sovereign. The effect of this change was to give India a **gold standard of value** instead of a silver one, and thus to bring her into line with all the great countries of Europe. The rupee still remains legal tender to any amount, but it is now a *token* coin, its value depending not upon the intrinsic worth of the silver it contains but upon its relation to the sovereign, of which it now represents the fifteenth part. The results of this change have been in every way beneficial. The Government have been relieved of a heavy annual loss, and trade of every kind has been stimulated by the removal of a serious source of insecurity.

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The names of Countries, States, and Provinces are in small capitals (e.g. BENGAL), and commercial products in italics (e.g. *Arni Muslins*, *Wheat*). The numbers refer to paragraphs.

The following abbreviations are used —*isl.*, island; *l.*, lake; *mt.*, mountain; *pk.*, peak; *r.*, river; *t.*, town.

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